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UNITED STATES AIR FORCE

GRADUATE STUDENT SUMMER
SUPPORT PROGRAM

1986

PROGRAM MANAGEMENT REPORT
UNIVERSAL ENERGY SYSTEMS, INC.

S

JAN 20 1989

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SUBMITTED TO

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

HOLLING AIR FORCE BASE

WASHINGTON, DC

DECEMBER 1986

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I. INTRODUCTION

Universal Energy Systems, Inc. (UES) was awarded the United States Air Force Summer Faculty Research Program on August 15, 1984. The contract is funded under the Air Force Systems Command by the Air Force Office of Scientific Research.

The program has been in existence since 1978 and has been conducted by several different contractors. The success of the program is evident from its history of expansion since 1978.

The Summer Faculty Research Program (SFRP) provides opportunities for research in the physical sciences, engineering, life sciences, business, and administrative sciences. The program has been effective in providing basic research opportunities to the faculty of universities, colleges, and technical institutions throughout the United States.

The program is available to faculty members in all academic grades: instructor, assistant professor, professor, department chairman, and research facility directors. It has proven especially beneficial to young faculty members who are starting their academic research programs and to senior faculty members who have spent time in university administration and are desirous of returning to scholarly research programs.

Beginning with the 1982 program, research opportunities were provided for 17 graduate students. The 1982 pilot student program was highly successful and was expanded in 1983 to 53 students; there were 84 graduate students in the 1984 program.

In the previous programs, the graduate students were selected along with their professors to work on the program. Starting with the 1985 program, the graduate students were selected on their own merits. They were assigned to be supervised by either a professor on the program or by an engineer at the Air Force Laboratories participating in the program. There were 92 graduate students selected for the 1985 program.

Again in the 1986 program, the graduate students were selected on their own merits, and assigned to be supervised by either a professor on the program or by an engineer at the participating Air Force Laboratory. There were 100 graduate students selected for the 1986 program.

Follow-on research opportunities have been developed for a large percentage of the participants in the Summer Faculty Research Program in 1979-1983 period through an AFOSR Minigrant Program.

On 1 September 1983, AFOSR replaced the Minigrant Program with a new Research Initiation Program. The Research Initiation Program provides follow-on research awards to home institutions of SFRP participants. Awards were made to approximately 50 researchers in 1983. The awards were for a maximum of \$12,000 and a duration of one year or less. Substantial cost sharing by the schools contributes significantly to the value of the Research Initiation Program. In 1984 there were approximately 80 Research Initiation awards.

UNITED STATES AIR FORCE
GRADUATE STUDENT SUMMER SUPPORT PROGRAM
1986
PROGRAM MANAGEMENT REPORT
UNIVERSAL ENERGY SYSTEMS, INC.

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Program Manager, AFOSR
Major Richard Kopka

Program Administrator, UES
Susan K. Espy

Submitted to
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Bolling Air Force Base
Washington, DC

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I. INTRODUCTION

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The program has been in existence since 1978 and has been conducted by several different contractors. The success of the program is evident from its history of expansion since 1978.

The Graduate Student Summer Support Program (GSSSP) is conducted as part of the Summer Faculty Research Program.

The program provides opportunities for research in the physical sciences, engineering, life sciences, business, and administrative sciences. The program has been effective in providing basic research opportunities to the Graduate Students of universities, colleges, and technical institutions throughout the United States.

The program is available to Graduate Students enrolled in either Masters Degree or Doctorate Programs. It has proven especially beneficial to the students who are starting their academic research programs.

Beginning with the 1982 program, research opportunities were provided for 17 graduate students. The 1982 pilot student program was highly successful and was expanded in 1983 to 53 students; there were 84 graduate students in the 1984 program.

In the previous programs, the graduate students were selected along with their professors to work on the program. Starting with the 1985 program, the graduate students were selected on their own merits. They were assigned to be supervised by either a professor on the program or by an engineer at the Air Force Laboratories participating in the program. There were 92 graduate students selected for the 1985 program.

Again in the 1986 program, the graduate students were selected on their own merits, and assigned to be supervised by either a professor on the program or by an engineer at the participating Air Force Laboratory. There were 100 graduate students selected for the 1986 program.

A pilot program for Graduate Student Summer Research via the AFOSR Summer Faculty Research Program (SFRP) was initiated by contract modification on 26 March 1982. The program was developed as an adjunct effort to the SFRP. Its purpose is to provide funds for selected graduate students to work at appropriate Air Force laboratories or centers with supervising professors who hold concurrent SFRP appointments.

For the 1986 GSSSP, emphasis was placed on selecting graduate students to be placed with either supervising professors on the SFRP or with the Air Force laboratory/center engineers. There were 163 GSSSP applicants. A total of 100 graduate students were selected to participate in the 1986 program.

II. RECRUITING AND SELECTION

The program is conducted on a nationally advertised and competitive selection basis. Advertising for the 1986 program was conducted via direct mail to all accredited schools. The mailing was sent to the department chairman at the schools. The departments included biology, genetics, ecology, entomology, chemistry, computer science, graphics, mathematics, physics, aeronautical engineering, ceramic engineering, chemical engineering, materials science, mechanical engineering, electrical engineering, metallurgy, nuclear science, and psychology. The brochures were also mailed to all of the participants in the 1984 and 1985 programs. Brochures were mailed to the Presidents of Historically Black Colleges. The brochures were sent to all participating USAF laboratories/centers; distribution was made through AFROTC units on university campuses; information was supplied to all who made requests. Overall, more than 9000 brochures were distributed throughout the country.

In 1982, 91 faculty and 17 students participated in the program. In 1983, 101 faculty and 53 students participated. In the 1984 program there were 152 faculty members and 84 graduate students appointed to the Air Force facilities. For the 1985 program, 154 faculty members and 92 graduate students were assigned to the Air Force laboratory/centers. In 1986, there were 158 faculty and 100 graduate student participants.

Application deadline was February 1, 1986. The selection panels met in February. The announcements of selections were mailed on April 25, 1986.

The 1986 SFRP is published as four separate documents. The reports are entitled Summer Faculty Research Program Management Report and Technical Reports, Volume I, II and III.

III. SITE VISITS

Visits listed below include those by UES and AFOSR personnel. The faculty, USAF research colleagues, and student participants are generally satisfied with the program. Criticisms were: a) too much paper work to administer program, b) housing difficult to find, c) 10 weeks too short for research period.

June 10, 1986	Rome Air Development Center Griffis Air Force Base, New York
June 11, 1986	Wright-Patterson Air Force Base Dayton, Ohio

June 24, 1986	Electronics System Division Geophysics Laboratory Hanscom Air Force Base, Massachusetts
July 10, 1986	Logistics Management Center Gunter Air Force Station, Alabama
July 11, 1986	Arnold Engineering Development Center Arnold Air Force Station, Tennessee
July 18, 1986	School of Aerospace Medicine Occupational & Environmental Health Laboratory HRL: Training Systems Division HRL: Manpower and Personnel Division Brooks Air Force Base, Texas
July 21, 1986	Engineering and Services Center Tyndall Air Force Base, Florida
July 22, 1986	Armament Laboratory Eglin Air Force Base, Florida
July 24, 1986	Wright-Patterson Air Force Base Dayton, Ohio
July 28, 1986	Rocket Propulsion Laboratory Edwards Air Force Base, California
July 30, 1986	Human Resources Laboratory Operations Training Division Williams Air Force Base, Arizona
July 31, 1986	Weapons Laboratory Kirtland Air Force Base, New Mexico
August 1, 1986	Frank J. Seiler Research Laboratory United States Air Force Academy, Colorado

Because of the proximity of UES to Wright-Patterson Air Force Base, several site visits were made to the following laboratories:

- Aero Propulsion Laboratory
- Armstrong Aerospace Medical Research Laboratory
- Avionics Laboratory
- Business Research Management Center
- Flight Dynamics Laboratory
- Human Resources Laboratory
- Logistics Command
- Materials Laboratory
- Wright-Patterson Air Force Base, Ohio

We find that the objectives of the GSSSP are being well served. Summer Fellows indicate that they are performing independent research, and are not being used as "summer help". We have found no abuse of the non-personal services requirements. Research fellows often conduct lectures and seminars at the Air Force locations.

As a record of the documentation supplied to the appointees, the UES Information and Appointment Packets are provided in Appendix I of this report.

IV. HISTORICALLY BLACK COLLEGES/UNIVERSITIES (HBCU's)

In support of with the Summer Faculty Research Program, and as part of the UES EEO/Affirmative Action Program, UES sponsored an information booth at the NAFEO (National Association for Equal Opportunity in Higher Education) Conference. The conference was held on April 6 through 11, 1986. UES provided information on the UES-AFOSR summer programs at this conference.

APPENDIX I

This appendix presents the following documents which were distributed to appointees and other program participants.

- A. Information Brochure for Summer Fellows.
- B. Questionnaire for participants and a summary of their replies.
- C. Questionnaire for Air Force laboratory representative and a summary of their responses.
- D. Questionnaire for Research Colleague and a summary of their replies.

APPENDIX 1.A

INFORMAION BROCHURE

for

SUMMER FELLOWS

on the

1986 USAF-UES GRADUATE STUDENT SUMMER SUPPORT PROGRAM

March 1986

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I. SUMMER FELLOW OBLIGATIONS

Universal Energy Systems, Inc. (UES) is required by contract to impose certain obligations on you in your status as a Summer Fellow. This section outlines those obligations, and you should read them thoroughly. You are required to sign and return the statement of understanding before the final processing of your appointment can be completed. The following is a list.

1. Research Goals and Objectives: A statement of research objectives must be provided to UES PRIOR TO the start of the summer research period. It should outline your goals and the approach you intend to follow in researching these goals. Neither travel expenses nor expense allowances will be reimbursed until after receipt of your statement of research objectives. The report should also clearly indicate the date of your first working day of the summer research period. If you are working with a professor during the appointment, the goals and objectives may be the same as submitted by the professor.
2. Final Report: At the end of your summer research effort, you are required to submit to UES a completed, typewritten scientific report stating the objectives of the research effort, the approach taken, results, and recommendations. Information on the required report format will be sent to you with a "FINAL REPORT INFORMATION BULLETIN" and sample report illustrating a suggested format. The final report must first be approved by your Effort Focal Point and then transmitted so as to reach UES by Tuesday, September 30, 1986. Payment of "Compensation" for the final two weeks of your ten-week research period cannot be made until UES has received and approved this report in the required format.
3. Program Evaluation Questionnaire: You will be sent a critique form to complete near the end of your research period regarding your impressions of the program. This critique form should be completed and returned to UES, along with your final report, by Tuesday, September 30, 1986. The return of this form is a program requirement; it also must be received by UES before the final compensation payment can be made.
4. U.S. Air Force - Summer Fellow Relationship: The U.S. Air Force and UES understand and agree that the services to be delivered by Summer Fellows under this contract will be non-personal services and the parties recognize and agree that no employer-employee or master-servant relationships will exist between the U.S. Air Force and the Summer Fellows. Non-personal services are defined as work performed by an individual who is responsible for an end item, such as a report, free of supervision of the U.S. Air Force and free of an employer-employee relationship.

As a Summer Fellow, you will not:

- (a) Be placed in a position where you are appointed or employed by a Federal Officer or are under the supervision, direction, or evaluation of a Federal Officer, military or civilian.
- (b) Be placed in a staff or policy-making position.
- (c) Be placed in a position of command, supervision, administration, or control over Air Force military or civilian personnel or personnel of other contractors or become a part of the U.S. Air Force organization.

The services to be performed under the GSSSP do not require UES or the Summer Fellow to exercise personal judgement and discretion on behalf of the U.S. Air Force; rather, the Summer Fellows will act and exercise personal judgement and discretion on their research programs on the GSSSP conducted by UES.

The Air Force will have unrestricted use of and access to all data developed during the period of this appointment.

II. ALLOWABLE TRAVEL EXPENSES

If you live outside of the area (50 miles) where you will be assigned for the summer program, the GSSSP provides potential funding for the trip between your home and your assigned research location. As soon as you have signed and returned your appointment letter along with the budget sheet, you will be authorized to receive reimbursement for travel expenses as described below.

You are expected to make your own arrangements for this trip, and after the trip you may invoice UES for reimbursement of allowable expenses in the format described in the Instructions for Invoicing for Compensation and Reimbursement section of this brochure. Closely coordinate your travel plans with your EFFORT FOCAL POINT or your supervising professor.

All travel reimbursements under Summer Fellow appointments are made according to current UES policy, and deviations from the approved budget are not authorized and will not be reimbursed. In light of these restrictions, you may choose either to travel by common carrier at coach rates or less, by driving your private auto, or by a combination of both. With any of these choices you may claim reimbursement up to the amount for the most direct routing, taking into the account the desirability of routing on interstate highways if you drive your private auto.

Reimbursement for direct route travel by common carrier will be paid on your submission of an invoice to UES following the invoicing instructions referenced above. In the view of the convenience of having a car at the research location, UES strongly recommends that a private auto be used for travel when practical. Reimbursement when you drive your private auto is at the rate of 20¢ per mile within the above routing restrictions and will be paid on submission of a suitably prepared invoice. These reimbursements cannot be extended to cover travel by your family if they accompany you on either of these authorized trips.

During the ten week summer research period, you will be authorized to receive an expense allowance in lieu of a per diem payment at a rate of \$28 per day for a maximum of 70 days. To receive this allowance, you must invoice for it and be living (50 miles) outside your area of residence.

These items above are the only reimbursable travel allowances authorized under the GSSSP appointment. Any additional travel expenses incurred during the appointment period will be your personal responsibility.

UES has arranged with a travel office in Dayton, Ohio, to have the air fare costs of your travel on the SFRP charged directly to UES. For you to take advantage of this, you must call this travel service. The number in Dayton, Ohio, is 293-7444 or 1-800-628-6668. You must give the code SL13 to have the tickets charged to UES.

If you require a cash advance for the start of the program, please indicate the amount on the bottom of your budget sheet. The cash advance will be deducted from payments of your bills of service.

III. INSTRUCTIONS FOR INVOICING FOR COMPENSATION AND REIMBURSEMENT

Attached is a copy of the Invoice Format that you are required to use to obtain compensation or reimbursement from UES. Note that all disbursements by UES for compensation, travel, and/or other expenses are subject to audit approval, so you must submit receipts substantiating charges invoiced.

In addition, you must prepare, sign, date and attach to each completed invoice a Brief Report of Effort

A. PREPARATION OF BRIEF REPORT OF EFFORT

Whenever you submit an Invoice for reimbursement to UES you must also include a brief report describing your activities for the invoice period. To meet this obligation, you must prepare, date, sign, and attach to your completed invoice a Brief Report of Effort describing the research accomplished on the appointment and explain any travel during the invoice period.

This report should describe innovative techniques and designs or discoveries which may be disclosed as patents. Rights to any inventions or discoveries shall reside with UES unless determined otherwise by the contracting agency.

The Brief report should never exceed one typewritten page and most often should be considerably shorter than one page.

B. PREPARATION OF INVOICE FORMAT

The financial items required on the Invoice Format are for COMPENSATION, TRAVEL, EXPENSE ALLOWANCE, AND PER DIEM.

Item (1) SOCIAL SECURITY/MAILING ADDRESS

Fill in your name, social security number, and address to which you wish to have your check mailed.

Item (2) COMPENSATION

(a) Indicate the dates for which you are claiming compensation, and indicate the number of days you are claiming for compensation.

(b) Multiply this number by \$60.64 for B.S. degree holders and enter the total dollar amount in the blank total charges for service. The accumulated total number of days you claim on this appointment may not exceed the number authorized in your appointment letter.

Item (3) TRAVEL

- (a) Under the heading Date indicate the date you departed on your trip and the date you arrived at your destination. If you are invoicing for a round trip, also list the date you departed on your trip and the date you arrived home.
- (b) Under the heading Dept/Arrival Time list the departure and arrival times for the corresponding days you listed under Date.
- (c) List your destination under the heading Destination.
- (d) Under the heading Mode, indicate your principal means of conveyance; i.e., commercial air, private auto, etc
- (e) Under the heading Amount, itemized these expenditures for travel reimbursement. Continue them on a separate sheet if necessary.
- (f) Total these travel items and enter the dollar amount for travel in this invoice on the line to the right of Total Travel Expense.

Item (4) EXPENSE ALLOWANCE

This item on the invoice will be used to claim the \$28 per day for reimbursement of costs incurred at your assigned research location.

- (a) In the first blank to the right of EXPENSE ALLOWANCE enter the number of days for which you are claiming the expense allowance at your assigned research location.
- (b) Multiply this number by the daily allowance rate of \$28.00 and enter this total dollar amount in the blank at the far right.
- (c) Itemize the days for which you are claiming the Expense allowance reimbursement. It can include weekend days and holidays as well as regular work days.

Item (5) PER DIEM

This item is not applicable to the GSSSP.

Item (6) INSTRUCTIONS

You may combine reimbursement requests for compensation, travel, and Per diem or expense allowance in the same invoice. The total for all items invoiced should be indicated on the blank on the right hand side of line 7.

If you have arranged your travel through the UES travel office as described on page 4, please indicate the cost of the tickets on this line.

IMPORTANT: Indicate in the space provide on each invoice the address to which you want the check mailed.

You must sign and date your invoice in the lower left hand corner as "Summer Fellow" before it is submitted; you **MUST** also have your Effort Focal Point countersign the invoice before it is mailed to UES Your Effort Focal Point is an Air Force individual at your research location who will be identified prior to your effort start date.

Invoices should be mailed to:

Universal Energy Systems, Inc.
GSSSP Office
4401 Dayton-Xenia Road
Dayton, Ohio 45432

IV
BILL FOR SERVICE

1. _____
Name (First, Initial, Last) Social Security # _____

Address (Street, City, Zip)

SERVICE: GSSSP Summer Fellow

SERVICE AUTHORIZED BY: Rodney C. Darrah

RATE AUTHORIZED: \$60.64/day for B.S. Degree

This service is for:

Government Contract: Project # 760
Government Contract No. F49620-85-C-0013

2. DATES OF SERVICE: _____ TOTAL DAYS OF SERVICE _____

TOTAL CHARGES FOR SERVICE: _____

ADDITIONAL ITEMIZED REIMBURSABLE EXPENSES: (receipts required for
expenditures over \$25.00)

3. TRAVEL: DATE _____ DEPT/ARRIVAL TIME _____

DESTINATION _____ MODE _____ AMOUNT _____

4. EXPENSE ALLOWANCE: (_____ days @ \$28.00/day) \$ _____

5. PER DIEM: (Not Applicable)

6. TOTAL AMOUNT OF BILL: _____

7. AIR FARE TICKETS CHARGED DIRECTLY TO UES. AMOUNT: \$ _____

Summer Fellow Signature - Date

Telephone

Invoice Approval: _____
Effort Focal Point Signature

X _____
Type or Print Name

Brief Report of Effort
Attached _____

Location: _____

Telephone: _____

Date: _____

Send bill to:
UNIVERSAL ENERGY SYSTEMS, INC.
ATTN: GSSSP Office
4401 Dayton-Xenia Road
Dayton, Ohio 45432

APPENDIX 1.B

PARTICIPANT'S QUESTIONNAIRE & REPLY SUMMARY

1986 USAF/UES GRADUATE STUDENT SUMMER SUPPORT PROGRAM
EVALUATION QUESTIONNAIRE
(TO BE COMPLETED BY GRADUATE STUDENT PARTICIPANT)

Name _____ Title _____

Dept. (at home) _____ Home Institution _____

Summer Supervising Professor _____

Research Colleague(s) _____

Laboratory Address of Colleague(s) _____

Brief Title of Research Topic _____

A. TECHNICAL ASPECTS

1. Was the offer of research assignment within your field of competency and/or interest? YES _____ NO _____.

2. Was the work challenging? YES _____ NO _____. If no, what would have made it so? _____

3. Were your relations with your Supervising Professor and research colleague satisfactory from a technical point of view? YES _____ NO _____
If no, why? _____

4. Suggestions for improvement of relationship(s). _____

5. Considering the circumstances of a summer program, were you afforded adequate facilities and support? YES _____ NO _____. If no, what did you need and why was it not provided? _____

6. Considering the calendar "window" of ten weeks being limited by varying college and university schedules, please comment on the program length. Did you accomplish: more than _____, less than _____, about what you expected _____?

GRADUATE STUDENT QUESTIONNAIRE
(Page 2 of 3)

7. Do you feel the Graduate Student appointment should continue to require affiliation with a Summer Research Faculty Member? YES____
NO_____.

8. Were you asked to present seminars on your work and/or your basic expertise? YES____NO____. Please list number, dates, approximate attendance, length of seminars, title of presentations (ues reverse side if necessary).

9. Were you asked to participate in regular meetings in your laboratory? YES____NO____. If yes, approximately how often?_____

10. Other comments concerning any "extra" activities. _____

11. On a scale of A to D, how would you rate this program? (A high, D low)

Technically challenging	A	B	C	D
Future research opportunity	A	B	C	D
Professional association	A	B	C	D
Enhancement of my academic qualifications	A	B	C	D
Enhancement of my research qualifications	A	B	C	D
Overall value	A	B	C	D

B. ADMINISTRATIVE ASPECTS

1. How did you first hear of this program? _____

2. What aspect of the program was the most decisive in causing you to apply? _____

GRADUATE STUDENT QUESTIONNAIRE
(Page 3 of 3)

3. How do you rate the stipend level? Meager_____Adequate_____
Generous_____.

4. Please give information on housing: Did you reside in VQQ_____,
apartment_____, other (specify)_____? Name and address of apartment
complex and manager's name._____

5. Would you encourage or discourage expansion of the Student Program?
Why?_____

6. Considering the many-faceted aspects of administration of a program
of this magnitude, how do you rate the overall conduct of this program?
Poor_____Fair_____Good_____Excellent_____. Please add any additional
comments._____

7. Please comment on what, in your opinion, are:

a. Strong points of the program:_____

b. Weak points of the program:_____

8. On balance, do you feel this has been a fruitful, worthwhile,
constructive experience? YES_____NO_____.

9. Other remarks:_____

THANK YOU

QUESTIONNAIRE EVALUATION SUMMARY
(Graduate Student)

A. TECHNICAL ASPECTS

1. Assignment in field of competency and/or interest? Yes - 99
No - 1
2. Work challenging? Yes - 99
No - 1
If no, why?
To have it in my area of competency/interest.
3. Were your relations with colleagues satisfactory? Yes - 99
No - 1
If no, why?
I was required to do digital design work and I am not a digital engineer.
4. Suggestions for improvement of relationships?
I suggest that the research colleague, supervising professor and graduate student meet regularly during the initial two weeks of program.

There were no problems with any of the relationships in the laboratory this summer.

Everything was fine.

Provide a means of obtaining equipment other than through government procurement (takes too long).

I had to spend a lot of time explaining my project and was given little control over the final project.

It may be helpful to stress communication with the research colleagues before the research period begins.

None, the individuals involved solely determine the nature of relationships for better or worse.

Perhaps an increase in feedback and recommendations.

More interaction.

My supervisor was extremely busy most of the time so I had little time to consult with him.

In my particular situation, I was very pleased with my professional relations. I see no ways for improvement. Dr. LeVow and I were in telephone contact well before the summer began.

Would be better if summer fellow had money available for getting supplies. Air Force system of research has considerable lag time between requesting equipment and supplies and receiving them.

Everyone was always willing to help.

Have more working space.

Dr. Gepel was gone much of the time.

I could not have chosen a better person to work with.

There is an atmosphere of secrecy about the research at the MLBP that was not pleasant to deal with. This is inherent, I feel in their work, and cannot be changed.

None-my situation was great.

It would be much better if my supervisor knew about me before I came. This time there was a lack of communication before coming to work this summer.

These people are very easy to work with and very helpful.

No changes suggested - everything was fine.

None, I've worked with this man before.

Dr. Mattie provides an excellent combination of guidance and encouragement without dictating research direction and stifling freedom.

Discussing goals before means establishes a more compatible relationship.

More communication.

It seems in this type of intellectual environment there is not much listening occurring, but rather "telling".

Dr. Wilkes was always very helpful whenever approached.

More regular meetings and seminars.

An early meeting with staff to discuss coordinating use of large pieces of equipment may help in scheduling, especially if several researchers will all need access to the same equipment.

- The dinners UES sponsored were pleasant.

Weekly activity reports in a much briefer format than those required for UES were periodically requested - this seemed to be somewhat repetitive and unnecessary.

I was included in all social activities (picnics, etc.) in my research division - this contributed to a very enjoyable working atmosphere.

I didn't have time to take a tour of the base and would have like to have done so.

We plan to present this research project at Conferences and to submit a report for publication in a scientific journal.

Good lunches.

The Base was a wonderful environment both to learn and live.

I did one or two small tasks outside my "range" as defined by my objectives. However, I volunteered for them and enjoyed the work as well.

Opportunity to attend a seminar by Alan Gevins. Opportunity to learn the use of IBM (Statpac) and VAX (SAS) statistical analysis systems.

I was always invited to laboratory functions.

I also attended meetings that were related to the project I was doing with people working at other than the measurement issue.

Enjoyed attending seminars and colloquia of other summer faculty and researchers here.

Would have been nice if a tour of the Base was arranged - it would broaden our perspective.

The lab workers also enjoyed a very good social relationship.

Extra activities included tours of other WPAFB facilities which were informative and interesting.

A special clearance so that I could view and tour more of the base. I was only cleared for my work station.

I will present a paper at my school in October with the Air Force permission.

Attended a lecture on acoustical noise suppression on speech signals in the UK given by Costas Xydeas of the Department of Electronics Eng., Loughborough University of Technology, Loughborough Leics, UK.

I appreciated my involvement in the meetings I did choose to attend. The meetings and exchanges added a great deal to the overall intellectual atmosphere in the lab.

	A (HIGH)			D (LOW)		
11. Technically challenging	A-	55	B- 40	C-	3	D- 2
Future research opportunity	A-	66	B- 26	C-	4	D- 4
Professional association	A-	65	B- 29	C-	4	D- 2
Enhancement of my academic qualifications	A-	62	B- 31	C-	5	D- 2
Enhancement of my research qualifications	A-	66	B- 29	C-	3	D- 2
Overall value	A-	69	B- 29	C-		D- 2

B. ADMINISTRATIVE ASPECTS

1. <u>How did you first hear about program?</u>	Colleagues	-	83
	Advertisement	-	12
	Air Force	-	3
	Direct Mail	-	2

2. Decisive aspect of application?

NOTE, MANY PUT MORE THAN ONE ANSWER

Area of possible future research funding	-	5
Good research opportunity	-	82
Opportunity to work with USAF	-	13
Location	-	9
Financial support	-	13
Lead to a Thesis	-	4

3. <u>Stipend level?</u>	Generous	-	23
	Adequate	-	68
	Meager	-	9

4. <u>Housing information?</u>	VOQ	-	10
	Apartment	-	56
	Other	-	34

5. Would you encourage or discourage expansion of the Student Program?

Encourage - 91

Discourage - 9

Encourage, why?

An excellent opportunity for students to earn needed money, get involved in applied research, make valuable professional contacts.

It gives researchers a chance to develop government contacts and express them to research areas of interest.

This program along with the mini-grant program gives students better insight into the proposal for funding process.

It is a great learning experience for the graduate student and those you can also gain new knowledge from incoming students.

It would introduce more students/faculty to USAF research.

Real world experience is the most important thing for an engineering student. If schools could give all their students real world experience, we would turn out much better engineers.

It provides an excellent opportunity for students to enhance their knowledge base.

This program has provided valuable experience to me, while at the same time the work I have done is useful to the Air Force.

Creates interest and competence in USAF concerned research areas.

The experience is extremely valuable. It exposes you to learning opportunities not available in the classroom.

It provides a unique opportunity for the student to meet with people in his field of interest.

Excellent way to expose graduate students to the research oriented career possibilities.

It is an excellent opportunity for graduate students and faculty. The facilities and support available.

Very good experience.

The opportunities for contact with Air Force research are excellent.

Personally, I found the position to be more valuable than any classroom.

Gives students an opportunity to continue research in other than academic environment.

It gives graduate students the chance to do research in many various areas which might not otherwise be available.

It's an excellent opportunity to graduate students to continue research through the summer with an excellent technical environment.

To give other students the opportunity to gain exposure to research.

It provides an excellent opportunity for a student to get a taste of research.

It was a great opportunity to learn and do research.

It is a good opportunity to engage in Air Force research.

I had a wonderful experience. It afforded me an opportunity for some different experiences.

Good opportunity for graduate students.

It gives experience to students, that they might not otherwise acquire.

It is a very useful program. It is beneficial to the student for providing experience in doing research. It is beneficial to the research community for providing informative research results.

It provided an opportunity to be involved in research in an area that is generally not available on most university campuses.

This was a mutually beneficial experience for myself and my focal point.

This program offers students the opportunity to adequately explore the field of aerospace medical research, and to pursue independent research projects in the area of our choice.

Other students should have the opportunity to become involved.

It is a great experience for a graduate student to get his feet wet.

Expose students to national research needs.

It gives experience and challenge, also it is a learning experience.

A fine opportunity to do concentrated research in a well-provided research facility.

The program gives a student a great opportunity to find a thesis or dissertation topic.

It's a good opportunity to gain experience, meet new contacts, and open up other opportunities while making money.

Because this is a very good program for graduate students.

Excellent opportunity for experience in a laboratory setting.

Many schools do not have enough money to support students, especially in the summer.

Excellent opportunity to expose young professionals to government work.

Gives students an opportunity to experience working in a professional environment vs. school atmosphere as well as to be able to apply their knowledge in different areas.

Universities do not provide adequate positions in research.

Because of the atmosphere for learning and research.

I feel like the students I have talked to all felt the experience was better than spending the summer at school.

To give other students a chance to work in a professional environment.

Program offers experience to different research environments.

Because it is a great experience for the students. The "academic" environment is pretty sheltered; exposure to a real research facility is enlightening.

Wonderful chance to explore one's area of interest with a broader focus than is available in graduate study. Also educational with respect to what's being done by AFOSR and various opportunities.

The program offers great research experience and a great opportunity to make money during the summer.

It provides a unique opportunity for students to apply their university training to research.

Because it provides students opportunity to get involved in research that is usually not available at their school.

For many students going for Ph.D. in school, this program gives the contact with the new developments of the field one is in and with the people with more experience.

It offers opportunities to develop contacts in your research field.

Not only was I able to contribute to an important project, I gained professional experience that added to my motivation to continue working in my field.

Gives students a chance to make technical contacts in their field of interest.

I think everyone benefits - the student, the faculty member, and permanent personnel at the lab. They seem to enjoy having new faces and ideas around.

Its a very productive program - hands on experience, learn working/research environment - affiliations.

It may open the doors for research or academic opportunities.

Valuable to learn about practical applications of classroom materials.

I think it will eventually improve the Air Force research capabilities.

Because of the opportunities it offers.

Good experience and exposure for young professionals.

This opportunity presents a side of research that is unknown to students.

Allow students to work on existing long-term projects for a short-term.

Because it presents a great opportunity for a student to become involved in research.

Its a dynamite way to learn research technique first-hand in a non-academic situation.

It gives a challenging research opportunity in a professional environment.

Allows for professional experience and application of research ideas in proper atmosphere.

To expose program to more people and be more flexible in meeting the needs of both student and the professor.

Very interesting work, lots of potential.

Because it provides a good incentive to get U.S. citizens into Graduate programs.

The program allowed me to work in a research atmosphere with a supporting investigative team.

It provides a valued experience.

Help students "get their foot in the door" in their field of study.

It seems to increase the knowledge base of both the student faculty and literature while providing valuable support to the academically oriented.

It's excellent experience. One is introduced to new and interesting areas of research.

This program affords practical experience in research conducted by the Air Force Office of Scientific Research. It is truly a unique opportunity.

Provides opportunity to develop research skills not available in the university environment.

It's an excellent research and learning opportunity.

I think it affords a great opportunity for students who have not had the chance to pursue intensive study due to other academic requirements. This was, at least, my own experience.

It could lead to dissertation projects that would be of value to the student and Air Force.

Great experience - lots of professional associations were made.

Summer opportunities are lacking in and around many universities. (That is an opportunity in one's field).

For the experience obtained.

I think it affords a good incite to prune and motivate more scientific minds in this country.

It was an excellent opportunity to participate in important research as well as to learn new skills and techniques. The people involved were all very helpful.

6.	<u>Program administration overall rating:</u>	Excellent	-	52
		Good	-	42
		Fair	-	6
		Poor	-	

7a. Comments on the strong points of the program:

Concept is excellent.

Opportunity to work in government laboratory and benefit from available scientific expertise.

Exposure to AF programs, research and facilities.

Interaction with others in the lab shed new light on our project, while our research enhanced the knowledge of others, autonomy.

Pay, research opportunities, opportunities to publish.

The exposure to areas of research interest to the Air Force was great. The DoD's research in EW is a major source of employment for engineers, and this exposure can only help me.

Knowledge of new operating systems and software gained.

Exposing people from the academic community to the research problems of the Air Force. This situation is beneficial to both groups.

I gained experience in EW areas and interest in this field. Also, helped my school finances. Opportunity to work with good people.

Professional and research association is excellent.

Ability to work in a real world, professional contacts.

Temporary change in research environment, possibility to continue work through the RIP program.

Freedom for the graduate student to investigate basically any research topic he chooses.

Facilities and support interaction with others in my field.

Excellent practical experience.

The program is an excellent experience for participants.

Good management, flexible scheduling.

Opportunity to further research qualifications.

The technical support provided was very good.

Helps by putting the graduate student in an environment conducive to research, provides needed financial support through the summer.

Good research opportunities, very good staff, good compensation.

Opportunity to do research in a strongly motivating and supporting environment.

Great chance to learn, make money and do research.

Professional interaction, new experiences.

Qualifications enhancement.

Exposing graduate students to an "industrial" type atmosphere which affords a large education experience as well.

Research opportunity.

Highly organized.

Unique opportunities provided through the program and chance to associate with colleagues that share interest in aerospace science.

Wonderful learning opportunity; working closely with experts in the field; specializing equipment and laboratory facilities.

The exposure to excellent research facilities and staff.

Opportunity to become involved in ongoing research - chance to do work independently.

Pay was good, I had the freedom to go at my own pace.

Research areas.

Good interaction and leeway between focal point and myself on research and progress; left me plenty of room to explore on my own.

Work at a major research center, professional contact with scientists, state-of-the-art work, hands on application of physics, astronomy.

Excellent research opportunities and facilities. Also, the people that I worked with were extremely helpful.

Gaining experience, meeting contacts and opening new research opportunities.

The program provided a good opportunity for the graduate students to work with something that interests them.

Opportunity to interact with professional and scientific community.

Generous funding, good equipment, professional association.

Research opportunity.

Outside contacts.

The many areas in which people participated.

The vast amount of knowledge and availability of equipment.

We're left alone to do research we're interested in without the constraints of our usual existances.

Pay, professional affiliation.

Good for qualifications, possible chance for publications, good salary for a graduate student.

Labs are well equipped - offering equipment that may not be available otherwise.

The opportunity to work outside a university and, therefore, be exposed to different ideas and approaches.

Flexibility, encouragement, mood of mutual respect. Also wages, educational benefits, growth in just being exposed to "somewhere else".

The program offers those with and without prior research experience a wider scope of learning and insight into various unique research projects carried out by the Air Force.

Excellent research facilities available, professional contact, exposure to research activities.

It provides research opportunities to wider range of people, provides numerous research ideas for future work, allows for the acquisition of new research skills.

Providing the student like me with a great technical experience during the summer.

Enhancement of academic qualifications and professional association.

Variety of research opportunity. Placement of people in labs where they are needed.

Pay, area, working conditions and people.

Allows students to carry out research while earning money and allows student to make technical contacts in his field of interest.

It offers an opportunity for graduate students to get practical experience under the guidance of a professor with whom they are already familiar and comfortable in working with. This "faculty-student team" approach also makes it easier for any further research to be continued after the 10 weeks are over.

Gives great exposure to many research facilities not available at university, many new ideas could be tested with such an opportunity.

The chance to expand the researcher's knowledge.

Can work in close atmosphere with research colleagues.

It's good that we work with engineers and scientists who have so much experience.

The opportunity it offers a student to do work in his field of graduate study.

Opportunity to be in a research environment.

Interfacing with the PhD's doing the actual research, and keeping paper work to a minimum.

Support from the other researchers in the lab.

Good research facilities are made available.

Opportunity for student to use excellent lab facilities and opportunity for student to do professional quality research.

Provides a productive means for a graduate student to participate in potential thesis topics at an Air Force center.

Excellent facilities and plenty of technical assistance and guidance along with flexible working conditions.

The possible opportunities that this program opens for a graduate student.

Diverse opportunities, exposure to work on an Air Force base.

The subjects to be studied are very interesting.

Opportunity to perform research in a well equipped-smooth running research laboratory, beneficial exposure to other researchers as far as technique and viewpoint.

New and encouraging research opportunities.

The variety of research opportunities.

Personal contact. Helpfulness, willing to accommodate students.

Pay, openness of topic material, important interactions with influential people.

Good experience, meet new people, competitive pay (with industry), interesting research.

Practical experience with basic research conducted by the Air Force.

Provides opportunity for graduate student to evaluate his strengths and weaknesses in an actual research environment.

Opportunity to explore new areas of research and educate myself on the research needs of the Air Force.

The opportunity to use state-of-the-art equipment and software was most exciting.

Very good experience - I became familiar with a very powerful super-computer system: Cray and CDC. I learned what programs are of interest to the Air Force.

Good pay; good way to meet professional people.

The opportunity to focus entirely on research, to work closely with researchers other than at one's home institution.

Strength of Air Force lab, cooperative colleagues, excellent facilities.

Ability for student's to work with professionals and work in real world atmosphere.

Increase motivation for research investigation. Tremendous gain of knowledge, convergence of thoughts from individuals from various institutions.

A very good experience for the graduate student. I also appreciated being able to call Universal Energy Systems for any little problems that arose.

7b. Comments on the weak points of the program:

I have no complaints.

10 week time period.

Government bureaucracy.

Graduate students are selected so late that their security clearances don't come through in time to be of any real use.

Difficulty in dealing with government procurement.

Slight unorganized management of program.

Single graduate students without advisors have little freedom to follow interests without constant approval, this time lag wastes valuable resources.

The graduate student application date should be earlier so that notification is earlier.

Ten weeks is an insufficient time to thoroughly investigate a problem.

None.

Should be better publicized.

I'm not convinced that the goals of the program are worthwhile.

Advance housing arrangements for "unattached" graduate students could have been more structured.

More responsibility in the way of reports would be desirable.

I would like to see a few more opportunities for research in electromagnetics.

10 weeks is a very short time to work on projects unless they are "continuing efforts".

More support at the specific location and from UES.

Although 10 weeks is the maximum given academic schedule, it is a minimum to complete any but the smallest projects.

10 week work period little short.

Time limitations are restrictive - extending the program to 12 weeks would be helpful (many of us end up working beyond the 10 week time period).

The lack of communication between the administrative personnel and the scientific staff/laboratories.

I would have liked more supervision or direction.

I didn't like the accounting procedure, the mail system in Albuquerque is slow, hard to get invoice in on time. I felt somewhat isolated from everyone else.

WSU housing is awful.

Finding housing pretty much on your own.

Housing arrangements.

Did not like having to submitting bills of service every two weeks. I would like to have just automatically got paid every two weeks.

Time (ten weeks) is not long enough.

Program was conducted in an area where living expenses were extremely high.

Bureaucracy of Air Force.

No availability of funds for extra supplies for research.

Time span - wrap up was a bit hurried.

No provision made for shift to full-time work or referrals.

The short time period.

Don't know who else is here until half the people are about to leave.

Difficult to work in a secrecy environment when one is on the outside, not good unless a relationship already exists with a student's professor.

It can be difficult to get started, but not due to any inherent weakness in the program.

Lack of assistance to students trying to find a place to live.

Lack of before hand knowledge about the student coming without the faculty and giving them a well planned project for 10 weeks.

UES does not communicate with us very much. Also only the most expensive living areas are suggested. Housing organization needs help. I felt as though "I was on my own."

Length of contract period not flexible.

Not enough interaction between other fellow on base. We are missing the opportunity to exchange ideas.

Tax assistance by UES in federal taxes should be considered regarding the stipend.

Should choose candidates well in advance to allow proper clearance.

It is hard to make much of a contribution in ten weeks.

I personally did not have any direction.

Getting checks late.

Need more information of where one may hand in the bi-weekly reports near the location of the lab.

Rapport with the administration.

There is too much time getting started, I was not sure what was expected of me for the first couple of weeks. More information should be given on researcher's responsibilities to the hosting branch.

Students need more guidance and direction.

It requires an affiliation with a Summer Research Facility member, there's limited outward interaction.

Would like more time.

No direction. I was given a vague description of my responsibilities and it wasn't until halfway through the program that a UES representative clearly defined what was expected (especially in the way of a report).

Not much structure and ability to work in other areas.

For my case a clear definition of the heat pipe analysis was not made resulting in a change of plan too late in the summer.

Need better communication between the program administration and the personnel in charge of the research facilities.

Stipend for different locations in various cities, housing and transportation for participants from cities too far away to travel with a car.

Lack of association between the UES employees.

Accounting (address error caused check to be late).

Narrowness of the summer experience (one student - one topic).

Too short.

The 10 week appointment period should be expanded to 12 weeks.

Time limitations more time would have allowed a more thorough understanding of the research conducted.

Not enough time to accomplish all the goals. The initial objectives stated were overly optimistic. Original objectives dealt with dopant diffusion, but I first had to do some thermal diffusion calculations. Learning the Cray operating system was a challenge in itself.

Away from home.

Information for housing and knowledge of surrounding community with respect to cost and security.

The program is relatively short and so is limited in scope but still sufficient to accomplish our major goals.

8. Has this been a fruitful, worthwhile, constructive experience?

Yes - 99

No - 1

9. Other remarks:

There should be less stress on completion of a project and more on exploring the lab. My final report was late due to the large amount of data that needed to be analyzed.

The program has provided interest and stimulus for a good many thesis topics. It is worthwhile because it gives the student a head start on research in his graduate program.

I would highly recommend this program to any Master's degree level graduate student.

This program is an important one. However, it does not appear to get the exposure it should nationally. A greater effort should be made to publicize the program on a national level.

Attending the University of Georgia affords little opportunity for hands on experience as the surrounding area is agricultural (primarily). The UES position provided me with otherwise difficult experience to obtain. I appreciated the appointment.

I enjoyed the summer appointment.

I found the summer support program to be an excellent opportunity. I enjoyed it.

This is an excellent program. Please keep up the good work, and thanks for your support and assistance.

I do not know if all summer fellows were treated as well as I by the hosting branch, but the Polymer Branch made me feel very much at home. I would like to thank UES for the opportunity to work with them.

Overall this program and the summer were very enjoyable. The people at the lab were friendly and helpful. Surprisingly, to me, I found the program to be run efficiently and well organized, given its size and the complexity of the working relationships. I did find the 10 week period a little short. Perhaps a 10-15 week variable period would be better, depending on the individual.

Lengthening the work period from ten weeks to twelve week on some projects might be needed.

I felt the program provided a unique opportunity that was very beneficial. I hope to be able to continue to work in the field of aerospace physiology and this was the first opportunity I have had to conduct research that was directly applicable to aerospace medicine. I had been in search of this type of opportunity for several years.

I thoroughly enjoyed my 10 weeks on base this summer. I would strongly encourage other graduate students to take advantage of such a worthwhile opportunity.

This was a very good opportunity for me to become actively involved in research.

It was a great job. I enjoyed it very much and hope to continue the research in graduate school.

Put your address on this form.

The freedom the program offers positively affects research outcome. The program is well run.

Lab orientation and tours are needed.

I feel that the housing situation dictates the way we rate stipend levels. The pay was excellent, but I wish that some typed contract would be available. The housing situation in Boston is terrible, and being from Wyoming, it was difficult to do a search prior to coming to this area. With that exception, this program was outstanding.

I thought that giving a small seminar on work was an excellent idea by my supervisor. It not only gave me good experience in giving presentations, it also gave me a good outline for the final report.

As far as question 4 on housing, Bea Moncrief is a landlady with only a couple of houses to rent in the area immediately south of the University of Dayton. I have several friends there and I was able to live inexpensively. For graduate students that know several people for this project, it wouldn't be a bad idea to check out the landlords in this area which is usually rented to U.D. students in the fall and winter.

Excellent program. Perhaps it may be possible to make an official place to send GSSSP candidates next year.

Thank you for the chance to further my education and my research skills.

This summer's work for me at least, only serves to manifestly demonstrate the failure of academia to properly account for the experiences and talent of those whom it supposedly serves. Having chosen to study diverse topics for intellectual challenge has only hindered my progress both in work and education. The academics claim their programs are designed to train one in a given area, and then much of that study is useless in practice. To make matters worse, the value of my previous graduate level training and Dr. Gegel's very academic studies cannot be used to further my legitimate academic goals.

Administratively I had only two concerns. 1) I was four weeks into my summer program before I got my security clearance. Is there any way to get the process started earlier? 2) The notification date of April 25 is so late that it is hard to make plans for the summer. Also, I kept two other possible summer employers waiting until I heard back on the GSSSP. I would hate to be put in the position of accepting a less attractive job offer on a "bird in the hand" type of situation. Other than these, I was very pleased with the administration of the program. All of my interactions with Sue Espy and Debbie Withers were pleasant and fruitful. Thanks.

I tried to do way too much in too many areas. I should have focused on a single, well defined project and finished it. Report writing would have been simpler, and my objectives would have been met. I gained much experience over the summer, but I'm afraid my report does not reflect it as well as if my scope had been narrower and, consequently, the project "completed".

I wish that sometime in my lifetime I would have an opportunity to serve in this program again.

My 10 weeks in San Antonio were more educational on a number of levels than a year in school. The friendliness and helpfulness of the people here was wonderful. The time flew by. I felt no pressure to perform and, as a result, performed beyond my own expectations.

I think this program was better conducted this year than last. Specifically I think it was very good that mention of tax responsibilities was made in the appointment letter, and that I was sent a list of the billing dates. My major suggestion for improvement is that something be done so that graduate students can get their security clearances sooner. I would have been assigned a more challenging and interesting task if my clearance had been effective when I first got here.

The only criticism I have of my experience is that "real" offices in quiet locations were not provided. We were dumped into a conference room with a number of other people. It was sometimes impossible to concentrate as noise and talking was constantly going on. The future, office space with real offices should be allotted for the participants in the program.

Effort should be made to help graduate students find a place to live upon arrival. Upon arrival, most students must stay in a motel until more permanent living quarters are secured. This can prove to be very expensive (\$50.00 per day). Also, living expenses at different lab locations can vary tremendously. It cost me \$800 per month for an apartment in the Boston area. Additional living expense allowance in high cost of living areas would be helpful.

This was the most rewarding summer I have had as a graduate student. I was able to use and reinforce the skills I had learned the previous year and I felt that I was able to contribute some important background research to a valuable project for the Air Force.

I found this to be a rewarding and enjoyable experience.

I have really enjoyed my appointment here at AFHRL, and feel I have learned a lot from the experience. I believe the program should certainly be continued, if not expanded. I would be interested in participating again some year.

1) A small briefing regarding the procedures for purchase of materials needed for research - whether we are eligible for that or not - would be helpful. 2) If possible, a small amount of petty cash (approx. \$200) would hasten up research a lot. I had to wait sometimes for a week and this is a large percentage of time compared to the short duration of 10 weeks.

Everyone at Brooks did a great job of helping with the incorporation of these short term researchers in a smooth and efficient manner. They were both patient and considerate toward myself and were invaluable in helping me to get orientated in the lab and in learning new techniques.

I found my experience with the GSSSP very rewarding from a research point of view. Though the work was at a fundamental level my understanding of areas of interest was vastly expanded. I also met a woman who will be my wife someday.

With respect to the selection a student for the summer program; is the recommendation of the supervising professor essentially the only consideration in choosing one student over another? And, if so, I am wondering whether it might benefit the research organization if each student's merits were also considered in making such a selection.

The phone system at WPAFB is poor.

I found it especially rewarding to work with Liz Martin. She was attentive to the atmosphere within the lab and responsive to individual needs.

The people at the Clusters and Warheads branch were very helpful.

Thank you for the opportunity to participate. I really feel that I've benefited from this program.

Thank you very much for a very rewarding summer.

It's an excellent program and hope it continues.

This is a very beneficial experience that will enhance my future endeavors.

Next time, more realistic goals should be stated at start. I felt obligated to dopant diffusion even though time was running short.

My civilian leadership was not (could not maybe) specific enough in their description of their desired results from my work. As a result I don't feel as if I gave them what they really wanted, or can use too much of an extent.

Overall, I found the experience very encouraging and supporting of my current and future research work. The program and my research colleagues gave me new and interesting insights into investigative research. I attended the program without a faculty member which made the transition a little difficult, but the people at RADC and Mrs. Agnes Bain made me very comfortable.

I found the summer work to be very unsatisfying. My area of interest and specialization is in applied electromagnetics, and yet I was doing digital circuit design. This would have been all right if I hadn't been constrained by 10 weeks in which to finish. And then the Air Force researcher that I had to work for (not with) was the most impossible person I ever had to deal with. His attitude was that he was always right, that he never made a mistake, and that whenever anything wasn't working properly, that I was the one who caused it. In the course of the work, we had seven major problems, and each time he was positive that I had done something wrong. In every one of the seven problems, the cause was his design, NOT in the work I had done. Also, I was extremely insulted, as a degree holding engineer, to find undergraduates from my home institution working at Seiler who were making as much as, and more than, what I was receiving for the summer. I have never been more disappointed with something as I have with this summer program, and I doubt that I will ever consider doing something like it again.

APPENDIX 1.C

LABORATORY REPRESENTATIVE'S QUESTIONNAIRE & REPLY SUMMARY

1986 USAF/UES SUMMER FACULTY RESEARCH PROGRAM
EVALUATION QUESTIONNAIRE
(TO BE COMPLETED BY LABORATORY REPRESENTATIVE)

Laboratory/Center _____

Name _____

1. How do you rate the correspondence, verbal and telephone communication, and other aspects concerning program administration?

Excellent____ Good____ Average____ Poor____ How could it be improved?

2. The participant selection process is two-fold: academic and technical. Did you have sufficient time to conduct an evaluation of applications?

YES____ NO____

Comments: _____

3. Was the number of faculty researchers assigned to your organization satisfactory?

YES____ NO____. If not, how many would be desired? _____ How do you determine this number?

LABORATORY REPRESENTATIVE QUESTIONNAIRE (Page 2 of 5)

4. Please rate the expense-paid pre-program visit:

Essential____ Convenient____ Not worth the expense____

5. In your opinion is the ten-week time period an optimum length of time to develop a viable working relationship among the faculty researchers, students, laboratory/center personnel and programs? YES____ NO____. If no, what length would it be.

Other comments:

6. Did your laboratory/center establish a seminar program, or other means, to "tap" the faculty associate's academic knowledge other than his research assignment? YES____NO____.

If yes, give description and evaluation.

LABORATORY REPRESENTATIVE QUESTIONNAIRE (Page 3 of 5)

7. Did the laboratory/center conduct a general briefing, tour, and/or other formal means of welcome and introduction for the associate assigned to your organization?

YES____ NO____.

8. Did you have a formal exit exercise for each associate such as a final technical briefing presented to the organization management, a private interview, or other?

YES____ NO____.

9. In your opinion, what was the overall quality of this year's participants as measured by attitude, technical competence, work habits, production and meaningful research accomplishment?

(Note: These answers will be held confidential.)

List Names	<u>Superior</u>	<u>Excellent</u>	<u>Average</u>	<u>Poor</u>
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10. Do you believe the Graduate Student Program enhances the Summer Research Program?

YES____ NO____

LABORATORY REPRESENTATIVE QUESTIONNAIRE (Page 4 of 5)

11. Was a student assigned under the Graduate Student Summer Support Program to your laboratory this summer? YES____ NO____. If so, was their participation productive? YES____ NO____.

12. Please furnish any recommendations you may have on improving the Graduate Student segment of the program.

13. Site visits were made by Program Director and/or Administrator and the AFOSR representative. Do you feel these visits are beneficial to the program participants and Laboratory in understanding the management of the program? YES____ NO____. Do you feel these visits should be done again next year. YES____ NO____.

14. UES has a coordinator assigned at your base to assist the Summer Faculty participants in the administration of the program. Did you find this beneficial to the program. YES____ NO____. Are there any problem areas coordinators should administrator in future years?

LABORATORY REPRESENTATIVE QUESTIONNAIRE (Page 5 of 5)

15. Please furnish any other comments or suggestion to improve the program in future years.

THANK YOU

1986 USAF/UES SUMMER FACULTY RESEARCH PROGRAM
EVALUATION QUESTIONNAIRE
LABORATORY REPRESENTATIVE

1. How do you rate the correspondence, verbal and telephone communication, and other aspects concerning program administration?

Excellent - 11
Good - 9
Average - 2
Poor -
No Response -

How could it be improved?

I can't identify any shortcoming.

Send all the initial information at one time- it seemed to trickle in, confusing things a little.

Works well, I could have used more support from the coordinator you provided (not to infer he didn't do his job - he did).

Provide more timely information on who is actually scheduled to be our summer faculty.

We had a single participant in 1986, and serious weaknesses in program administration were not apparent. Much weaknesses may have appeared if several scientists had been participating at our laboratory simultaneously. A minor weakness was the occasional typographic error in UES correspondence, leading to temporary confusion on part of reader.

Guidance concerning non-U.S.citizens should be improved.

Some of the faculty associates were confused about who was supposed to certify their vouchers.

2. Did you have sufficient time to conduct an evaluation of applications?

Yes - 17
No - 5

Comments:

It is always difficult to get the applications to the proper technical people in time for review, but the time is adequate.

I receive 100 applications each year, reject 50 on 1st screen, prioritize the remainder, I am assigned 15-20 routinely - it gets pretty hectic, and I have to do a lot of second guessing on merits of each professor and possible assignments.

Need minimum of 3 weeks.

We had one applicant. Evaluation time was quite adequate.

There was just too little time between when we got the application and the time we had to make a choice. Evaluation of only the paper work submitted is insufficient. Discussions need to be held with the prospects to determine if mutually beneficial research programs can be devised - suggest starting right after Christmas or even early December.

Additional week to get lab evaluations to UES would be helpful.

Need to receive the applications as they are received at UES, not in batches a few days before the selection process.

3. Was the number of faculty researchers assigned to your organization satisfactory?

Yes - 15

No - 7

If no, how many would be desired?

10, By the number of requests from the in-house of research - we were going to fund two ourselves this year but due to a calculation - we funded one.

14, Two professors per RADC Directorate to be put into critical technology areas.

2, We have 3 veterinary hyperbaric medicine chambers. This capability will readily accommodate 2 Summer Faculty Research participants.

19, Our laboratory has 19 in-house work units, and we would like one researcher for each work unit.

10, By the number of laboratory scientists requesting researchers.

12, The number requested by our research colleagues.

2 or 3 more, By the interest shown in the program by our scientific staff.

4. Please rate the expense-paid pre-program visit:

Essential - 21

Convenient - 1

Not worth the expense -

5. In your opinion is the ten week time period an optimum length of time to develop a viable working relationship among the faculty researchers, students, laboratory/center personnel and programs?

Yes - 19

No - 3

Other comments:

Considering scheduling difficulties it is reasonable. If a slightly longer period were available, it would be very effectively used in most cases, but not all. On the assumption that more participants are available on the shorter period, then the 10 weeks is about optimum.

Although 10 weeks is adequate another 2 weeks would be beneficial since it seems the researchers usually spend the last 2 weeks writing their report. This only allows about 8 weeks for actual research.

Ten weeks is satisfactory. Optimum length is determined by the "quality" of the person and the research undertaken.

Time enough to develop relationships, but was "fast track" for some of the research. Optimum would depend on the effort.

We are comfortable with ten weeks; once in a while would like to have the contract fund an additional 1 or 2 weeks for a professor.

10 weeks is too short for most projects to get the quality of support that would be desirable.

The 10-week period was sufficient to develop viable working relationship. However, more time could have been used for actual experimentation; while a research protocol may be designed for 10 weeks, unanticipated events may dictate additional time.

Longer, minimum 4 months would be optimum, but probably not practical. I believe the short period of work time could be more effectively utilized if we can get a little more time on the front end to allow Air Force sponsors a better opportunity to evaluate prospective Summer Fellows in relation to the work the sponsor wants performed. More likely to get a better match between researcher and research project. I have also found instances where there has been little other than the pre-program visit. More communication needs to be encouraged and perhaps structured into the program.

However, 12 weeks would allow for a two week period for orientation, data compilation, or research preparation with a full 10 weeks available for productive research and report preparation.

12 weeks. Research time is lost on preparing final report.

I answered this question both ways. Yes, the program was long enough in the sense that starting any earlier or ending any later would impinge too much on the individual candidate's schedule at the university. No, in the sense that by the time the candidate gets starting on his/her research project, it is time to return to the university. Thus, leaving some question as to the development of a viable working relationship.

6. Did your laboratory/center establish a seminar program, or other means, to "tap" the faculty associate's academic knowledge other than his research assignment?

Yes - 11

No - 11

If yes, give description and evaluation.

Both branches that used summer faculty had at least one special session - we could have done more in this area however,.

Several informal seminars but no formally established program.

Briefings helpful.

Periodic presentation and discussions with technical managers.

The "tap" was on a close working relationship with the visiting faculty and our staff.

General seminars and research project seminars were held.

Some of the professors give seminars/presentations in various technical areas.

Brown bag lunchers for SFRA and lab personnel. This was our first try; we had some growing pains, but all who participated thoroughly enjoyed it.

Each was asked to give a seminar on their research findings toward the end of the 10-week period. This worked out well but in the future, I think it would be better to schedule both a pre and a post session. We did not avail ourselves of the opportunity for additional seminars since the schedule of work was very tight. We plan to do so next year.

Several conferences were sponsored in the local area and all research candidates were given the opportunity to attend.

7. Did the laboratory/center conduct a general briefing, tour, and/or other formal means of welcome and introduction for the associate assigned to your organization?

Yes - 15

No - 7

8. Did you have a formal exit exercise for each associate such as a final technical briefing presented to the organization management, a private interview, or other?

Yes - 17

No - 5

9. In your opinion, what was the overall quality of this year's participants as measured by attitude, technical competence, work habits, production and meaningful research accomplishment?

List Names	<u>Superior</u>	<u>Excellent</u>	<u>Average</u>	<u>Poor</u>
	45	39	12	

10. Do you believe the Graduate Student Program enhances the Summer Research Program?

Yes - 19

No -

No experience - 3

11. Was a student assigned under the Graduate Student Summer Support Program to your laboratory this summer?

Yes - 15

No - 6

No experience - 1

If so, was their participation productive?

Yes - 15

No - 1

12. Please furnish any recommendations you may have on improving the Graduate Student segment of the program.

Reduce the (perceived) pressure on us to accept a graduate student solely on the faculty member's recommendation and desires.

Our experience was so good that we would be pleased to have more and will make a stronger effort to help advertise that aspect of the program in the future.

Should work closely with the summer professor.

I have a problem with the schedule in which professors are selected and then graduate are selected, but I don't know of an easy solution. I strongly recommend that the contract support graduate students coming back a second time. I prefer about 1/3, since these "experienced" hands are of great help to the 1st year students on the logistics of survival in an unfamiliar setting.

Need more applicants. Our graduates were super - could use more. Make the selection process longer (3 weeks) and start earlier. They don't need to be tied to performing as the lab people (sponsor) take great care of them!

Not applicable, we had no personal experience with Graduate Student segment of the program.

None - excellent program/opportunity.

13. Site visits were made by Program Director and/or Administrator and the AFOSR representative. Do you feel these visits are beneficial to the program participants and Laboratory in understanding the management of the program?

Yes - 12

No - 2

N/A - 8

Do you feel these visits should be done again next year?

Yes - 12

No - 4

14. UES has a coordinator assigned at your base to assist the Summer Faculty participants in the administration of the program. Did you find this beneficial to the program?

Yes - 12

No - 2

N/A - 1

Are there any problem areas coordinators should administrator in future years?

Coordinators should work on security clearance earlier.

No contact with the coordinator - it seems they should initiate contact with me.

The coordinator should have longer hours in his office - three hours in the morning are not enough. More up-to-date list of housing is needed. Suggest using the Civilian Personnel Newcomer's Package.

We encountered no significant problem areas.

Local coordinator was not well informed about UES and its structure. He always did find out what we needed to know and get back to us in the early part of the program. By the end of the summer he had come up to speed.

The Coordinator at AFGL did an outstanding job this year, as in past years. She handled a variety of problems for faculty members and did not limit her help to just a few specific problems. Very helpful!!

Dan Danishek did an excellent job. We need "special badges" for the faculty researchers. Procedures for assigning badges/passes and collecting them could be improved.

I was not aware of a base representative.

15. Please furnish any other comments or suggestion to improve the program in future years.

Insure that skills presented in the resume is consistent with skills required on the job. Make sure candidate understands the task to be performed and make certain security clearances are on file.

I recently briefed the Commander and Tech Staff at AEDC on the program. The Commander strongly endorsed the program, and that means that support will come from all Directorates in the future. Perhaps AFOSR can use endorsements of that type to increase the size of the program in the future years. Congratulations on a well run program. On behalf of the staff at AEDC, I extend our thanks for all the help and prompt answer's forthcoming from UES and AFOSR.

Be more specific on holiday pay - either's they get it or they don't - there has been much confusion on this.

Keep them coming.

Need 10 profs and 7 graduate students. High school program was also great. Keep up the good work.

It would be beneficial if we could be more involved in determining the arrival and departure dates of the participants. It would also be helpful if the focal point had more knowledge concerning the requirements for submitting pay vouchers/working times/allowances that can be made for a participant's personal time off during their visit relative to the 10 week requirement, etc.

Keep the basic work period at 10 weeks. However, consider authorizing a 2-week extension in exceptional, justified cases.

Reconsider your mechanism for paying the Summer Faculty. This was my most commonly heard complaint.

I feel it is essential to provide more time for our Laboratory people to evaluate prospective Summer Faculty researchers. They need time to talk to each other before a faculty researcher is chosen and before the researcher commits himself. This will assure a better fit between researcher and the intended research.

Good program. No suggestions for changes.

Just one. I feel that UES should not accept applications from Foreign Nationals for the Summer Faculty or Graduate Student Programs if they have no intention of accepting these individuals into the program. Their applications should be returned to them immediately stating why they are unacceptable. Also, applications received after the closeout date should be returned to the applicant immediately stating why they are unacceptable.

APPENDIX 1.D

PARTICIPANT'S RESEARCH COLLEAGUE QUESTIONNAIRE
AND REPLY SUMMARY

1986 USAF/UES SUMMER FACULTY PROGRAM
EVALUATION QUESTIONNAIRE
(TO BE COMPLETED BY PARTICIPANT'S RESEARCH COLLEAGUE)

Name _____ Title _____

Division/Group _____ Laboratory _____

Name _____ of
Participant _____

A. TECHNICAL ASPECTS

1. Did you have personal knowledge of the Associate's capabilities prior to arrival at work site? YES___ NO___ . If yes, where/how/what?

2. Was the Faculty Associate prepared for his project? YES___ NO___.

3. Please comment on his preparedness/competency/scope/depth of knowledge of subject area: _____

4. Please comment on the Associate's cooperativeness, diligence, interest, etc. _____

5. In your opinion, has his participation in this summer program contributed to an increase in the Associate's potential to perform research? YES___ NO___ . Comments: _____

COLLEAGUE QUESTIONNAIRE (Page 2 of 4)

6. Did work performed by the Associate contribute to the overall mission/program of your laboratory? YES___NO___.
If yes, how?_____

7. Would you classify the summer effort under the SFRP as research?
YES___NO___.

Comment:_____

8. Was a Graduate Student assigned to your group this summer?
YES___NO___. If so, did this enhance the research productivity?
YES___NO___. Was it an administrative burden? YES___NO___.

9. Were your relations with the Associate satisfactory from a technical point of view? YES___NO___. Suggestions as to how they might be improved:_____

10. Do you think that by having a Faculty Associate assigned to your group, others in the group benefited and/or were stimulated by his presence? YES___NO___. Comments:_____

11. Do you feel that introduction to each other, together with the summer work experience and performance could form a sound basis for continuation of effort by Associate at his home institute?
YES___NO___. If yes, how?_____

If no, why not?_____

COLLEAGUE QUESTIONNAIRE (Page 3 of 4)

12. One of the objectives of this program is to identify sources of basic research capability and availability to the USAF. On a scale of A to D, how effective do you think this program will be in that respect? (high) A B C D (low)

13. Also, please evaluate:

A (high).....D (low)

Opportunity to stimulate group activity
Professional association
Program administration

A	B	C	D
A	B	C	D
A	B	C	D

B. ADMINISTRATIVE ASPECTS

1. When did you first hear of this program?
2. Were you involved in the screening and prioritizing of the faculty applicants for your lab? YES___ NO___. If yes, do you have any suggestions for improvement of the procedures used?_____
3. How do you rate the importance of the expense-paid pre-program visit to the work site? Not worth expense___ Convenient___ Essential___. Please add any comments:_____
4. Considering the calendar "window" of ten weeks (limited by varying college and university schedules), please comment on the program length. Were you as a team able to accomplish more than___, less than___, about what you expected___? Comments:_____
5. Would you desire another Faculty Associate to be assigned to you and/or your group/division? YES___ NO___. If no, why not?_____
6. Would you desire additional Graduate Students in this program? YES___ NO___.

COLLEAGUE QUESTIONNAIRE (Page 4 of 4)

7. Should the Graduate Students only be assigned to research with the Summer Research Faculty Member? YES___ NO___.

8. Should Graduate Students continue to be assigned without Summer Research Faculty supervision? YES___ NO___.

9. Other remarks: _____

2056S

1986 USAF/UES SUMMER FACULTY PROGRAM
EVALUATION QUESTIONNAIRE
(TO BE COMPLETED BY PARTICIPANT'S RESEARCH COLLEAGUE)

A. TECHNICAL ASPECTS

1. Did you have personal knowledge of the Associate's capabilities prior to arrival at work site?

YES - 80

NO - 55

If yes, where/how/what?

National Council of Teachers of English.

Dr. Hoffman's resume made it clear to us that he could benefit our program.

Dr. Kolitz participated in the 1985 Summer Research Program and under a continuing grant during the year.

A resume.

UTSA Professor, University of Texas MDA.

Supervisor.

Met Dr. Quimby as a result of some reprint requests he sent me; later arranged meeting to discuss technical interests.

As my professor several years ago.

Previous employment as a student.

Telephone conversation, pre-summer visit.

Mr. Hasty worked in this area as an engineer prior to accepting his present faculty position.

She had provided a resume.

Resume and pre-program visit.

Over the past 4 years, I have actively recruited applicants for this program. My first considerations are the needs of the laboratory and identifying an individual who I feel would most benefit from having worked in this lab. Having done this, I then review the literature for investigators who are currently publishing in that area and contact them to explain what the program has to offer. This is how Dr. Claiborne was recruited.

Dr. Hajela has visited and participated in technical discussions with me and other Branch personnel.

Resume and publications. Also pre-work visit.

Telephone and meeting at Eglin AFB.

Pre-summer visit was with a staff member who subsequently was transferred.

Multiple, lengthy phone calls and pre-summer visit.

Associate was recommended by his Department Chairman.

Information from his resume.

Resume. I had his thesis advisor at Cornell, and we chatted.

Worked with me last year.

He had worked previously for another group under this program. They supplied copies of his technical reports for my review.

From fellow research scientists.

Journal publications.

Fabian is a Professor at my alma mater.

Dr. Wooten is an internationally recognized expert in human color vision. I was familiar with his published research as well as his contributions to various research societies.

Meetings, discussions, presentations, research papers.

Personal contact, FJSRL, lab commander.

He had worked on this program before.

The quality of prior research he had performed for the USAF (Brooks AFB). His reputation among his peers.

A colleague of Dr. Fulk made me aware of his expertise in Artificial Intelligence.

Reviewed application form.

Prior cooperative work at Syracuse University - RADC supported.

He spent a 1 year sabbatical leave here about 6 years ago.

At OSU two years.

He was here last year on the Summer Faculty Program.

Literature publications.

Being a faculty member at WSU, Prof. Mehrotra visited me numerous times seeking research funds in area of ceramics where I learned of his interests.

Application.

Statistics literature. Also two year appointment as visiting professor.

In the past Prof. Battles has been associated with an AFGL SU support contractor during sabbatical leave and as a part time employee. He was assigned to work on some of our turbulence problems through analysis support. This arrangement had resulted in several publications in which we shared authorship.

I met Pat Gannon while I was a Ph.D. student at Colorado State University - he had been a formal associate of my major professor, Dr. Wu Cotton.

I have visited Dartmouth several times and have communicated with Mike on technical problems over the past several years.

In a minor way from colleagues who had worked with him on a previous summer faculty assignment.

Prof. Sturm worked here at AFGL last summer.

Division Director discussed his resume, and a member of our Division interviewed him during a visit on official business at his university and reported to me.

Through journal and conference.

Prof. Rao was known to us for a number of years. He wrote two well known books on optimization and finite element methods. He worked as a visiting scientist during the summer of 1984 when he was at San Diego State.

I have known Dr. Becus for a year. We visited University of Cincinnati to discuss research topics and Dr. Becus was a participant.

I have known Dr. Young for over a year.

Dr. Eastep worked in the laboratory in a number of occasions. He was an AFIT faculty member and familiar with our work.

I had knowledge of the associate's capabilities through journals, conferences and mutual acquaintances.

Dr. Doria has exchanged experience at the NASA, Langley Research Center. I have some knowledge of his work.

From previous participation in Summer Faculty Program and unsolicited proposal.

I had several long phone conversations concerning his research plans.

He worked with us last summer on the program.

Had obtained and read a copy of Ph.D. thesis.

Dr. Flentge has previously participated in the SFRP in this lab (POSL).

Prior efforts conducted at the Materials Laboratory at WPAFB.

Dr. Samimy was highly recommended to us by his colleagues. We were aware of his capabilities through his publications and technical correspondence.

Telephone interviews, visit to discuss select topic, telephone discussion, and letter proposal submitted before arrival.

Previous inquiry by Associate about research opportunities in AAMRL within his field of expertise.

Dr. Manicke met with AAMRL personnel prior to his arrival. His work was also represented in the literature.

I knew him as a professor at Wright State University.

2. Was the Faculty Associate prepared for his project?

YES - 129

NO - 6

3. Please comment on his preparedness, competency, scope, depth of knowledge of subject area:

Dave Anderson is an excellent physical organic chemist, and while not having specific knowledge of energetic materials, was quickly able to apply his broad general knowledge to the problem at hand.

Dave's principal area of expertise was in crystallography, however, he quickly picked up the knowledge needed to work in energetic materials.

John had a very good background in quantum chemistry, in general and ab initio calculations in particular. He has had 18 publications in this area.

Nationally recognized linguist and educator.

Super credentials, lots of experience with expert systems and government work. A voluminous C.V.!

Dr. Kolitz was familiar with the Battle Management aspects of the program and with the data processing tools available to support his research. This knowledge was based on his previous work and current application for communications network and point to point connectivity.

General knowledge of the subject area and statistical techniques were excellent. Specific knowledge about job difficulty as it relates to performance (depth) moderate.

Top 1% of our three associates, he was the best!

Super job. Prepared research report for DARPA.

Excellent in all areas! Very knowledgeable in solid state physics/optical measurement.

No prior knowledge of subject except mathematical background, very resourceful in accumulating data and method of approach.

Prepared by attending workshop on subject; highly knowledgeable in the subject area.

Very well prepared because of pre-arranged work assignment and prior reading/study.

Well prepared, exceptionally competent.

He has a fairly good background in the field of plasma physics; his work dealing with plasma/EM radiation interaction revealed inexperience or lack of recent experience in this particular area.

He had worked on this project in FY85 during its design therefore he was prepared to aid in implementation.

Good historical research skills - first time he worked in area of History of Science.

Dan was competent, prepared, and fully capable for the research project we gave him.

She thoroughly understood the subject area and was extremely competent.

Very good. Had asked for and received copy of computer model of laser thermal damage prior to beginning of program.

Pre-unit paved way for research in area before coming to RADC. Prepared himself for work in a new area with vigor, enthusiasm, good results.

Associate was highly competent and innovated. Research objectives were discussed during pre-program visit. Associate read reprints of research articles and reviewed literature.

Research objectives were discussed during pre-program visit. Associate read journal articles on subject. Associate was very competent and learned quickly.

Extremely good since he has been working on this project for some time.

This summer project was a continuation of an on-going effort.

Dr. Hung was ideally suited for the problem we asked him to investigate. He has an extensive background (including teaching graduate courses) in mathematics. He recommended a new approach which provided significant new insights.

Selection of a research task was based on his competency to accomplish the research. Professor Jones was skilled and experienced in the application of the mathematical, computer and engineering sciences.

Knowledge of communication protocols was very good.

Dr. Hadlock was well-prepared to undertake the project he was assigned.

Participant immediately got to the essential aspects of the project and provided to be very productive throughout.

He was very well prepared and very capable. The project got off to a good start and really accomplished more than expected.

Quite simply, Dr. Claiborne's preparation was so complete that she actually began collecting data the day following her arrival. As for the scope and depth of her knowledge, it should be noted that Dr. Claiborne came to us from the pre-immanent laboratory in the country in this particular area of research; hippocampal neuroanatomy. Her recent publications on this subject further confirmed the fact that she possesses a particularly sophisticated degree of expertise.

Extremely well prepared with deep hands-on/book knowledge of work area. Extremely competent.

Well prepared, expanded prior work: directing graduate student on cavity flow. He is considered a specialist in this technology area.

Worked in his area of specialization; performed very well; scope expanded to entire USAFSAM at request of Commander (study of computer needs).

A new area for him; he brought/bought books, read intensively; worked intensively with a small group; performed very well.

Very qualified, came prepared, and spent plenty of time on project.

He has been working in neural modeling for about a year, and is gaining competency in a very esoteric field.

Dr. Keener's background is differential equations. He had no prior experience in optimal control and had to spend several weeks "boning up".

Prior experience with NASA was useful to his work here. That experience was in the area of system reliability and component part availability.

He seemed to have excellent competency in his field, and this contributed to his success during his stay here.

Dr. Moorthy was well prepared in Computer Science. However, human factors is a relatively new area for him. He chose to work in human factors while here.

We were interested in working with Dr. Boggs because of her knowledge of decision-making research from a business perspective. We found her very knowledgeable in this area.

Dr. Loy was very knowledgeable in the area of computer business games.

He is very knowledgeable in the theories and methodologies of software engineering.

Very well prepared! He immediately applied his knowledge of new theoretical technique to our needs.

Excellent, had completed further study from last summer's work.

He teaches related subjects at the University of Florida in Operations Research. His rapid grasp of the problem indicated he was well prepared for the area.

Dr. Day's previous research has not been in the main stream of Artificial Intelligence (AI) - he is attempting to make the transition. I believe that Dr. Day has developed this past summer the in depth AI knowledge required to do credible research in AI.

Dr. Whidden was willing to work on a number of projects, however, he had not formulated his final plans until his arrival at the USAF School of Aerospace Medicine.

Had more than acceptable capability.

Dr. Moyer has world acclaim in the field of microbiology of human tumor cells.

Dr. Chastain is one of the nation's leading researchers in the aspects of attention addressed by the project.

He was familiar with the general area and used his pre-site visit to adapt the issues to the flying domain. He had no prior knowledge of issues relating to flying training research.

Several detailed discussions were held with Dr. Wooten prior to his arrival at Williams AFB. Dr. Wooten has been involved in research directly related to that performed here and his competence and depth of knowledge in this area are unequalled.

Fabian is an expert in fuzzy set theory and damage diagnosis and was well prepared to focus these talents on our damage paradigm.

Due to uncontrollable circumstances, the subject area was changed at the last minute. Dr. Englert had sufficient general laboratory skills to adept to the new subject area.

Dr. Cheng conducted a literature search prior to his arrival, as well as visited researchers in the field. Dr. Cheng has a background in molecular physics which was needed for this project.

80% prepared (could have been slightly better prepared) very competent, depth and breadth of knowledge excellent - field of research in closely related area.

Very prepared, very competent, had intimate knowledge of subject area.

Very prepared, highly competent, and well versed in a broad range of areas that contribute to the topic.

Exceptionally well prepared. He is an expert in the blood brain barrier and is well published in this area.

He holds a Ph.D. in Chemistry with Industrial Hygiene training, is interested in the subject, and did some background reading on the subject before arriving.

After his initial visit, Dr. McDonald had a chance to research the literature and was better prepared for the challenge at hand when came back for his 10 weeks at the lab.

We completed a literature search prior to his arrival. He was also briefed of what we wanted during his initial visit.

She was well prepared to research a subject of which she had little knowledge. She competently sought out and organized information in an area where she would have little reason to know much at all.

Very knowledgeable in both image processing and artificial intelligence tools and techniques.

Limited knowledge of image processing, no knowledge of image algebra.

He is a first rate designer of semiconductor processing equipment and research equipment.

Excellent.

Dr. Chung is well qualified in all aspects of thermal management and heat transfer.

Dr. Patel's extensive background in immunology more than adequately prepared him to participate in the summer program.

He had specific experience in molten salts and a good general knowledge of physical chemistry.

Dr. Jones arrived with no set project or laboratory to work in. Her work in the past has been structural, involving the electron microscope, and not the physiology or biochemistry (functional) fields that I work in. This was a career broadening project for her, giving her an overview of potentially useful biochemical techniques and their applications.

Very cooperative individual.

Associate talked with personnel in lab or his pre-program visit and therefore was well prepared for the summer program.

He attended a workshop on ceramic composites and began a very extensive literature review prior to his arrival.

He was very well prepared and interested in our parallel (symbolic) processing research. His background in the design on parallel system was very helpful.

Because of his prior knowledge in thermodynamic calculations, he required minimum preparation for the task he was assigned to do. He demonstrated an exceptional depth of knowledge of the subject area.

Had knowledge from literature.

He has worked on this particular topic of Raman states of doped Si and is well aware of the literature and has sophisticated facilities.

In depth knowledge in general subject area. Developing familiarity with topic.

He has been working in x-ray topography for several years as an active researcher.

He requested and was sent published papers and references on the areas in which he planned to work. He made a pre-assignment visit to discuss the effort and prepared well for his research.

He has sound basic knowledge on signal processing.

Dr. Greene was fully prepared for his project. He is highly competent and has a very profound knowledge of the subject area.

Application of basic skills to new problem area was outstanding.

Dr. Tomiyama was extremely knowledgeable in the subject area. He has worked in the field for at least 10 years.

Very good.

Dr. Zobrist was well prepared to investigate the automated CAD software due to his extensive professional experience at University of Missouri Computer Science Dept. Dr. Zobrist greatly extended our knowledge by his in-depth coverage of Petri-Net theory and applications.

Had researched subject material before hand and came with both the knowledge and background required to start right in.

He has excellent knowledge of the subject area of turbulence modeling, and the specific applications areas of the different models.

Excellent background. The selected research topic was a direct follow-on of work he did for his Ph.D. dissertation.

Dr. Gupta and I had been collaborating by mail and telephone. We were very ready to get down to work together.

He was sufficiently well-versed in both dynamical meteorology and computer programming for the project he proposed.

Prof. Battles was well prepared to assist us in a number of problems in atmospheric turbulence and optical effects. He is competent in both the scope and depth of atmospheric optical effects as evidenced by prior publications and the results of his efforts this summer.

He was thoroughly knowledgeable with all aspects of his project.

Well versed, well prepared, very much at home in the field.

Pat visited AFGL approximately 2 months prior to his summer term. We discussed potential mutual interests, and I gave him several papers of ours. He took them home, read and assimilated the material and wrote an excellent and very "insightful" work plan.

He is a competent experimental plasma physicist. Over the past summer he has been able to interact with us on a wide range of subjects.

He was quite familiar with work and extremely competent.

Dr. LoPresto had extensive experience in observing solar spectral lines on other telescopes. He was able to make significant observations at Sac Peak within a week of his arrival. He rapidly reduced these observations.

The Associate is knowledgeable in mathematics but not in meteorology. However, the program was tailored to take advantage of his competency and perspective in mathematics.

Fully competent, well prepared.

He continued his research on the problem he investigated last summer - as a result he was well prepared.

Our specific work was entirely new to him but he had adequate general background to build on.

He has been working in this area for six years and is well known. He formulated his summer problem within one week after he had technical discussion with me and others. He is also excellent with computers.

Associate made two visits, before the summer program started, to familiarize himself with the research task and get acquainted with the facilities and on-going research tasks. Most of his experience was in subsonic aerodynamics, limited experience in supersonic/hypersonic aerodynamics.

He had reviewed applicable reports, letters and the like that provided information on aircraft transparencies, test methods, and durability problems.

Dr. Yip grasped the problem who were concerned with and knew how and where to start on the problem. This was really an extension of work he had done earlier.

Dr. Rao's extensive teaching experience, his keen interest in working in the area of control structure synthesis and his preparation for this summer work were evident from his immediate work progress.

Dr. Becus was already interested in the area of dynamics and controls and he looked at the problem of structure control synthesis before coming to the laboratory. He was very well prepared.

We have indicated to Dr. Young our interest in coupled thermal-mechanical problems and optimization. Dr. Young is already actively involved in these areas and collected excellent ideas for the project.

Dr. Eastep was quite well prepared in the area of structural dynamics and applying his knowledge to structure control synthesis.

Dr. Yousuff is considered to be one of the foremost researchers in the field of model reduction. His overall knowledge of the technical discipline, system theory, is excellent.

He is reasonably knowledgeable in computational aerodynamics but is exceptionally able in computer operation.

Dr. Murty's background and expertise in the research area allowed him to immediately begin his technical work.

He was well prepared in control theory and dynamics area and had begun studying the flying qualities referenced suggested prior to his arrival.

He proposed a research problem in advance; it was a problem which he had been considering already, and about which he was quite well informed regarding the literature. Fortunately, it was one which also was of concern to us.

He had extensive knowledge of the research literature on vigilance. He had also completed the design and programming of studies to be run at HRL.

He had written and visited to coordinate his summer activities and acquire background information.

Dr. Chen had an indepth knowledge of the subject area and was well prepared to perform the research.

Reasonably so - was not used to emphasis on producing real numbers and company with experiments. Chemical kinetics outside his thesis etc., weak.

Excellent in all regards. Previous experience prepared Dr. Flentge well.

Dr. Ho is an exceptionally well prepared physicist with wide ranging knowledge of power related materials. He is well connected with scientific leaders and is up-to-date on emerging technologies. Dr. Ho has more than 80 technical papers.

Dr. Samimy is a very capable research scientist. His knowledge of fluid dynamics, instrumentation in particular LDV system is outstanding as a result very little time was required for his orientation.

Associate was reasonably well prepared but lacked mathematics background that would have been beneficial.

Dr. Manicke is extremely knowledgeable in his area.

Excellent background in human head/neck mechanics. Fully prepared to pursue chosen project when arrived.

He is a very hard worker. He did an excellent job for his summer position. He is extremely competent and by the end of the summer had developed a great deal of knowledge in the subject area.

Dr. Tacker's depth of knowledge in artificial intelligence and preparedness to perform the research planned was considerably less than I expected.

Accomplished extensive background reading in areas of teleconferencing technology and AAMRL C³ programs. Forwarded summer plan and schedule prior to arrival.

Good knowledge of general area, well prepared and competent.

4. Please comment on the Associate's cooperativeness, diligence, interest, etc.

Dave, in addition to the planned work in energetic materials, helped supervise an undergraduate in writing a complex program for running our EPR spectrometer with an IBM AT.

Dave worked on several projects during his ten weeks, spanning both physical organic chemistry and analytical chemistry. He was always willing to work on any aspect of the lab's research problems.

John applied himself not only to ab initio studies of energetic materials, but to learning the area of semi-empirical calculations. In both areas he has been very productive.

Terrific.

Volunteered to work weekends! Went TDY with project officer. Worked well with colleagues and users.

Dr. Kolitz works well independently and contributes to the organization by providing technical advice and contributing current information and literature on subjects related to our work.

Excellent!

Top 1% again.

Most cooperative, diligent.

Excellent. I was very unhappy to have him leave when his tenure expired - would hire him full time were it possible.

Excellent.

Very cooperative.

Couldn't have been better.

The associate was very cooperative and showed a great interest in theoretical investigation of plasma/EM relationship.

Very cooperative, high interest, stayed on job. It is a pleasure to work with Doyle.

Superb.

Dan did much more than was expected of him and in fact worked nights and weekends towards the end in order to finish before he had to return to LSU.

Probably one of the hardest working and dedicated people we've ever had here at the LMC. She was interested in the material and pursued it at enthusiasm.

Couldn't ask for more than was provided in such areas.

Associate was very interested in the research. Worked continuously and took work home. Couldn't ask for a better person. Other's in lab felt the same way.

Associate was very cooperative. Couldn't ask for a better person. Very interested in work.

Cooperativeness, diligence and interest were very good.

All was very good.

Dr. Hung was highly motivated toward resolving the problem given to him. He worked very well with all of us in the office and also with personnel in AFLC/LOC.

He exhibited the best of attitudes. We were highly pleased with his interest, cooperativeness, diligence and self-motivated technical involvement.

Excellent.

Dr. Claiborne provided an exemplary example of how to efficiently execute a complex research task in an unreasonably brief period, without imposing upon any of her colleagues to accomplish this.

He worked diligently on the project and with great interest.

Participant worked long hours with full enthusiasm, interest and motivation. Also inspired associates within the center to participate in discussions on the subject matter.

Extremely cooperative, very hard working, and expressed keen interest in the technical aspects of the job.

Very friendly and cooperative. Worked effectively at high speed with enthusiasm.

He is particularly in one of our critical technology areas which is internal carriage and release of weapons from high performance aircraft. He is submitting 2 AIAA papers as a direct result of his summer work.

Completely committed.

Totally committed to the task at hand.

Easy to work with.

Excellent.

He was very interested and cooperative, especially since his area of interest coincided with ours.

Extremely cooperative and anxious to contribute to our mission. Very easy to work with and to discuss technical matters with. Hard worker, making full use of the short time he had available with us.

He was very cooperative, worked very hard, and maintained a high level of interest during his entire stay here.

Dr. Moorthy was very cooperative. He was a diligent worker who stayed with the task and worked very hard.

Dr. Boggs was very interested in our projects, easy to work with and very cooperative when anything was requested of her.

Dr. Loy was very interested in Air Force Command and Control, very diligent in his work and easy to work with.

He is very interested in the work here and sees many ways that he can assist us.

The highest.

Excellent - self directed - needed little supervision.

Dr. Sivazlian responded directly to our request. There were no side issues or discussions on alternate approaches. He expanded upon our ideas and presented them for our approval.

Dr. Day was extremely cooperative, worked hard and was very much interested in our research. He was a pleasure to have in our group.

Dr. Whidden is very cooperative in all his work here.

Outstanding.

Dr. Moyer is a very pleasant person to work with. He is very determined even in the face of unsatisfactory conditions.

Dr. Chastain was very cooperative and hard working. He was eager to share his extensive knowledge and was very easy to work with.

Dr. Hass was exceptionally capable of putting together his research equipment, arranging for the necessary support. He worked extremely hard and managed to complete quite a bit of work with little burden on other staff.

Outstanding on all events.

Fabian was extremely dedicated, working evenings and weekends despite the emotional trauma associated with the death of his father this summer.

Dr. Englert was quite willing to participate in the project, even though it was not the subject area he had anticipated.

Dr. Cheng was quite enthusiastic and projected a very positive attitude.

Very cooperative and diligent, extremely interested.

Very cooperative and personable, extremely hard worker.

Exceptionally cooperative and diligent.

Dr. Houk is most cooperative and has become a professional associate as well as a personal friend. He seems to be interested in continuing this work.

Dr. McDonald was extremely cooperative. He not only did his research but helped us with routine problems in his spare time.

Dr. Rascati has been a pleasure to work with. He demonstrated exceptional cooperativeness, diligence and interest.

Totally cooperative. Worked long hours and was obviously interested in learning.

Dr. Fulk was very positive in all areas of his summer's work.

Dr. Rice was very positive in all areas of her summer's work.

He pushed very hard during the time he was here to complete the system fabrication in the machine shop.

Excellent.

There was some difficulty in communicating. Dr. Chung had difficulty workin in our system, preferring to directly deal with secretaries, machine shop personnel, etc., making it difficult for us to run our own shop.

Dr. Patel is very courteous, cooperative, diligent to spend long hours to complete projects and maintain a high degree of interest in bringing these projects to completion.

Associate was extremely cooperative and very interested in seeking out areas of mutual interest.

The best.

She was highly cooperative and willing to work long hours in the laboratory and library.

Very conscientious - shows great interest in his work. Gets along well with professional and unprofessional staff.

Very cooperative, hard working, broad interests in composite mechanics.

Again, as above, because of his background in parallel processing he was able to contribute to our research.

Gopal Mehrotra is highly enthusiastic, cooperative and worked well with all the scientists and engineers in the laboratory. He performed well and did a careful study while in the laboratory.

Superior.

Dr. Schneider is a very fine person with whom to work and expended great drive and motivation on this work.

Very cooperative, diligent, interested, etc.

Dr. Stock was an extremely easy person with whom to work, his enthusiasm showed in his hard work and patience in explaining the techniques and results to others.

He was extremely interested and easy to work with.

Excellent.

Dr. Greene was very cooperative, highly diligent and was very interested in the subject of his research.

Top rate. Working with Dr. Grosky was stimulating, motivating and highly productive. I hope to continue this relationship in the future.

Dr. Tomiyama is a hard working conscientious researcher. His comments and perspective were respected by all within our group and we all benefited from his enthusiasm and interest in our projects.

Excellent - communicated well, was very interactive.

Dr. Zobrist was extremely interested in our ADAS software and was a constant user for his time with us. His diligence lead to several improvement suggestions that are being implemented.

Professor Kung was very cooperative, diligent and interested in accomplishing his stated objectives.

The associate was very willing. He asked intelligent questions about optical applications of the work.

Couldn't have been better. He fit right in. Always willing to talk and listen to others. Spent many an evening and weekend working on the problem.

A full professional who had the work as his total focus.

A full two-way cooperation with in-house scientists and frequent evening and weekend workings characterize his ten-week stay here.

Prof. Battles demonstrated a keen interest in our immediate problems and worked very diligently on them. This directly resulted in our completing analysis of data from a recent large experimental program in a very timely manner.

All aspects of Dr. Christian's interactions with our laboratory were positive.

It was a pleasure to work with Don, cooperative, adaptable, hard working and cheerful.

High cooperative and diligent - a real pleasure to work with. In addition to pursuing some of his own interests, he helped us get a position of our numerical cloud model working.

He is highly motivated to succeed in his field and very much interested in his work.

Very cooperative and hard working.

Associate worked well with both the observing and scientific staffs. He participated in our staff reports and gave a colloquium on his work.

Very cooperative, competent and showed strong interest.

Cooperative, worked well with laboratory personnel, diligent, attentive.

Dr. Sturm was highly cooperative. He worked hard on the problem.

His spirit of cooperation, diligence, interest and ability to work harmoniously with others were very high.

He was extremely cooperative and was always willing to listen and comment on various technical problems even though those problems are outside the scope of his summer work.

Associate was cooperative in every way, worked quite diligently and showed a great deal of interest in the project matter. Associate worked to a large extent, independently of the sponsor.

Very high.

Very diligent and interested. Through frequent discussions he quickly acquired a good working knowledge about the specialized areas applicable to aircraft transparencies, while also providing information to a AFWAL personnel concerning statistical analysis issues.

Dr. Rao was extremely cooperative and forthcoming in discussions, presentation of seminar and consultation in the field of expertise - optimization and finite element analysis.

Dr. Becus is cooperative and is more than willing to work with members of FIBRA and others.

Dr. Young was persistent and cooperative in spite of our problems with our computers during system expansion.

Dr. Eastep is extremely cooperative and always ready for consultation particularly in his specialty, aeroelasticity.

The Associate was cooperative during his stay. He was keenly interested in developing a good working relationship with the members of the research team.

He is courteous to members of our group and the feeling is mutual. He has shown strong interest in his work here.

Dr. Murty was energetic and hard working. He enthusiastically pursued his research. He was cooperative in taking direction, as well as being very capable of independent analysis.

Once the project was agreed upon, Dr. Pujara was very cooperative and enthusiastic. He was very thorough and learned quickly by on-the-job contact with members of the Flying Qualities Group.

Jorge blended into our branch beautifully! He carried out his project very competently, was quite willing to spend time consulting us about related matters, and with his graduate students, conducted an excellent workshop for lab personnel on his research.

He was very dedicated to his work.

Very cooperative and self-motivated to produce a useful research product.

Dr. Chen's interest remained high throughout the research period and he diligently performed his tasks with an excellent spirit of cooperativeness.

Associate was diligent and interested in new areas however academic pace seems more leisurely.

Excellent work attitude and performance. Could not have been better.

Dr. Ho is extremely cooperative and has diligently formed alliances with Materials Laboratory personnel to permit us to fully utilize their extensive facilities. Dr. Ho has presented problems of the Aerospace Power Division to the Materials Lab personnel that he has gained the confidence and voluntary consultation time to great effect.

He is a very diligent, cooperative and most importantly interested in the research effort. His knowledge together with his willingness to perform under all conditions have really been an asset to our program.

Cooperative.

Was very interested, cooperative and worked very hard.

He is very cooperative, highly motivated, and extremely diligent.

Most cooperative and interested in pursuing task. Worked evenings and weekends.

He was cooperative in working on his project as well as other problems we have at our laboratory. He was diligent in his work and showed great interest.

Highly cooperative, worked long hours on extensive software analysis and documentation.

Tops! Best I've seen. Got everyone in my group involved and excited about his project. Made extensive contacts with other agencies and contractors to track down related projects and equipment.

Very high in all categories, very highly motivated and skilled, diligent. A good experience for all.

5. In your opinion, has his participation in this summer program contributed to an increase in the Associate's potential to perform research?

YES - 132

NO - 3

Comments:

The program has provided hands on experience with EPR spectroscopy and an introduction to energetic materials chemistry.

Dave has had a chance to work both in analytical chemistry/chromatography and physical organic chemistry/EPR spectroscopy and has been introduced to the area of energetic materials.

He has learned a great deal about semi-empirical methods and has been exposed to the areas of energetic materials and tribology.

Dr. Kolitz's expertise is utilized not only by the Electronic Systems Division but also by the MITRE research engineers who support our program.

Subject content broadened Dr. Lance.

He learned a lot about new glasses and optical materials. We (AF) learned a great deal about optical spectroscopy of rare earths.

Methodology now in place to do more complicated problems.

Became familiar with the Air Force's problem.

Gained several contacts.

The practical experience gained here will be of great benefit in the classroom.

His exposure to a number of applications for expert design was beneficial to him.

He is now in a position to perform work and research in Maintainability that few are able to perform.

Broadened his background.

Associate gained new insight in a new area of research.

He worked on a frustrating real world problem, which was not yielding to conventional textbook techniques. I think his effort benefited him as much as it benefited us.

He acquired knowledge of current research in Distributed Operating System, Fault Tolerance, and distributed data bases.

His involvement into the Armament Division's mission area was a motivating and thought producing work assignment. Extremely good experience for further research.

It is my opinion that the Associate came to this laboratory with an already fully developed potential. Her level of productivity over the past several years confirm this. However, I do believe that as a result of this program it is far more likely that she will go on to perform research in areas of interest to the Air Force.

The project is relatively new to Dr. Hadlock but given more time, he could have produced a nice research project.

He obviously learned a lot from the people in the Branch with whom he worked and, in turn, made a very significant contribution.

He learned a number of techniques useful in his academic research program.

He participated in a workshop in internal carriage and release which provided an excellent overview of related industry and government activities.

Repeated his dissertation in a real world environment.

It opened up a new area of interest/specialization to him.

He is planning on applying for a mini-grant.

Dr. Keener is now aware of some of the important problems associated with advanced guidance laws.

Prof. Scott now has a clear understanding of our work and how it fits into the overall Air Force program to develop conventional weapons. Subsequent work terms here would be even more valuable to us, because of his experience in this field.

As I understand this question, the Associate's ability to perform has not been changed by the summer program.

He is much more qualified in the area of human factors.

While Dr. Boggs was here, we introduced her to psychological research in decision-making. We feel (and she agrees) that this opened new vistas for her.

Dr. Loy was exposed to psychological decision-making research and Air Force decision-making. Both should help him in his research.

He has pointed out deficiencies and suggested ways to correct them.

Further understanding of USAF issues/needs.

Exposure to new community of workers at Optical/Microwave Interface.

Dr. Sivazlian's talents were likely not taxed in this work. We hope that the problem has stimulated his interest and that he will continue research in this area.

Dr. Day addressed some fundamental unsolved issues in Artificial Intelligence. The results he accomplished this summer provide an excellent base to continue his research.

Associate worked in a relatively new sub-field.

Dr. Moyer has had no experience in biophysics and/or technology.

His participation allowed him the opportunity to relate his research interests to those areas in the flying domain. He does not have access to a flying program at his university which will limit his ability to pursue directly the issues that he dealt with this summer.

He has gained insight into the Air Force problem of assessing damage to protective facilities. He should be successful in acquiring his own grants with this experience.

For the fact that Dr. Cheng has become better acquainted with experimental techniques.

Obtained new insights into aerodynamic research programs of interest to the Air Force. Broadened his research base.

Gained even deeper appreciation and knowledge of subject area.

He has now had some experience with method of moment solutions and the solution of integral equations.

Especially in surgical manipulations that enhanced his abilities to perform basic research which demands surgical expertise.

Dr. Houk is a professor of Chemistry and already is a qualified researcher.

Although he was a highly qualified individual, I think he was happy to obtain the new experience.

A Ph.D. should already know how to perform research. An "increase in potential"?

Gave her a much better view of the requirements for a successful grant application.

Although Dr. Fulk came well qualified, his capabilities grew because of the practicality of his work.

In the broad area of image processing and the special structure associated with an image algebra, Dr. Rice's research capabilities grew because of the practicality of her work.

He laid the ground work for an epitaxy system that will be used for GaAs and other compound semiconductors research at the University.

While participating in this program, Dr. Patel was able to become directly involved in the development of two additional immunology laboratory techniques which he thinks will have further application in his laboratory endeavors in the future.

He was exposed to organic electrochemistry, an area he had not been familiar with earlier.

It has given her some understanding of how functionally oriented research is approached. It should broaden her base of research to go beyond simple structural studies.

Associate was apparently encouraged to complete his doctoral studies after conducting research here.

His contact with our mechanics people at MLBM and AD tech and our material scientists has given him new insights into research issues and requirements.

He is interested in the pursuit of further research in symbolic parallel processing and peculiarities associated with this new field.

Much is learned from the summer faculty program that one is unable to put a value figure on it except saying that it is the best thing next to visiting scientist program and must be continued.

It gave him access to materials and knowledge of applicability of the measurement to AF problems.

His background was mainly in non-semiconductor materials, so he gained experience with GaAs and Si bulk and epitaxial Si.

His participation in the program provided him with the opportunity to work on the leading edge of an important technology with current state of the art equipment and computer support.

To know some applications to RF receivers.

We have identified and solved many potentially very useful research problems in advanced camera calibration and robotic vision.

During the summer Dr. Tomiyama explored many of the applications of his research area. He was introduced to the concept of "tactical weather intelligence" and how applications of his research area are an integral part of that concept.

By introducing Dr. Zobrist to the integrated method of CAD, he will be able to apply his designs for distributed parallel processing in a more efficient manner.

What is read in books is not always what is found in real life. It is not as simple as on paper.

The optical applications of turbulence models is relatively unique and offers a challenging research area.

That's a tough one to answer. I'm not sure that it increased his potential, but that's because he was fully competent to begin with.

Dr. Gupta is an established researcher, however, this summer experience improved his appreciation of Air Force research needs.

By the exposure to a global spectral model and by the experience of working with global data.

I think the associate's exposure to a research facility outside the University environment has given him first hand overall experience in larger Air Force research programs.

The cooperation was near ideal where he learned several important laser techniques from us and we gained considerably from his previous knowledge.

We hope so and believe that it did. He has ideas for follow-on work and we went to explore further.

After the heavy teaching and administrative load Pat has been carrying, he wants to get back into some research. I think this summer gave him some "momentum" toward doing this research.

I think that we have been able to provide some new perspectives to his work and, as a result of our interaction, he has gotten some new insights into the subfield of collisional plasmas.

Associate was exposed to several new instruments that should enhance his studies of spectral line variations.

The exposure in meteorology and interactions with other Summer Associates have undoubtedly increased his research potential.

Has become acquainted with new computer systems, language and techniques.

In the course of his research, Prof. Sturm mentioned a new analytical technique.

Since he was exposed to the bigger picture, his future research will expand and he will work on practical problems.

I think his exposure to the programs existing in AFWAL and his participation in a supersonic/hypersonic research effort has improved his capability in this technology area.

He has become familiar with the pertinent issues effecting aircraft transparency durability and applicable laboratory test methods.

It certainly gave him an insight into what the practical problems are as we see them.

Very much so. He gained substantial insight into the research topic control-structure synthesis.

Certainly that was my conclusion after discussions with Dr. Becus.

I am firmly convinced this is the case after talking to Dr. Young.

Yes, definitely so. This was the conclusion after several discussions with Dr. Eastep.

The associate has a deeper understanding of problems confronting the USAF.

Unfortunately, he will not be able to continue when he returns to his university.

I believe that Dr. Murty gained the capability to envision how exploratory research can be transitioned into development and ultimately a product.

Dr. Pujara learned quite a bit about the relationships between airplane dynamics and flying qualities, as shown in his final report and by his own admission.

He appeared to benefit from discussions with HRL personnel and he was able to conduct studies that would have been very difficult to accomplish at other research facilities.

He has gained useful experience and exposure to the specific research needs of the Air Force.

He was exposed to equipment, techniques and ideas that could be of value for future research.

It certainly broadened his scope and I hope interests.

Dr. Flentge's work has increased his exposure to tube evaluation methods. This information is invaluable in the area.

The potential collaboration of Dr. Ho with personnel at the Aerospace Power Division and the Materials Laboratory has greatly expanded our opportunity to conduct joint research within the laboratories.

He has become interested in program that can contribute to our Laboratories mission.

He gained considerable insight into concepts of spatial kinematics of human motion.

He has gained a greater insight into the realities of experimentation employing human subjects.

The participant gained much from the experience at the lab and should be fully capable of carrying on in some research area.

Dr. Rattan advanced the state-of-the-art in the area of g-suit valve design.

But less than expected.

Associate now has excellent grasp on our research plans and how his research area dovetails.

He picked up some good information in our Lab, also improved his data collection techniques and knowledge of cognitive area.

6. Did work performed by the Associate contribute to the overall mission/program of your laboratory?

YES - 131

NO - 4

If yes, how?

Dave both worked on an on-going project in the lab, making good progress on its solution and improved our EPR facilities.

Especially in the area of analytical chemistry Dave provided research support to projects of prime interest to the lab, but for which we had insufficient manpower to explore.

He worked on on-going research interests, providing about half the total research effort in tribology.

The problem of connectivity among the many BM/C³ assets is a large one. Dr. Kolitz provided an objective generic approach for achieving this.

Explored an area with potential promise for which we did not have the staff.

Right on. Demonstrating its systems!

AI initiatives - better definition.

A highly efficient means for converting IR to visible light in fluoride glasses was evaluated.

Gave us method of approach to a class of problems.

Determination of experiment.

Provided a ten-fold increase in computer program speed.

The research was fundamental, and therefore immediate benefits are limited.

A fresh look at the implementation software and hardware-software interface was extremely helpful.

His work provided important background material on the Strategic Defense Initiative (SDI).

The model Dan built will serve as the basis for many future projects.

A tool is needed in the Air Force to assess our ability to deliver fuel to aircraft in war. This tool didn't exist before. Prof. Lewis worked on its development.

Fundamental flow in calculating thresholds for multiple pulse flashes corrected.

Associate's work contributed to several breakthroughs in research. These will be followed up with grants.

Research has resulted in a publication to be written by the associate. There is also considerable interest in continuing his research.

His independent analysis will prove the basis for the USAF position in a USAF contractor dispute.

His research will be used in near future developments, within the Directorate to enhance mission support capabilities.

By identifying protocol services necessary to support distributed applications.

Dr. Claiborne's research project was agreed upon during our initial discussions concerning the program and prior to her application. Therefore, the research she proposed to perform was designed to tie in directly with our projects stated objectives.

Dr. Hadlock has formulated a new approach in our math modeling work.

Findings in his report will have a major influence on the conduct of a center contractual effort.

Formed a foundation upon which the laboratory can build to make the hydrocode analyses more efficient and effective.

One of his projects resulted in a new analytical technique that was used to upgrade/prove.

Better understanding of fluid mechanics associated with cavity flow.

His final report is being studied by USAFSAM senior managers at this time.

His overview of the program and topological analysis were invaluable.

Developed a new simulation capability.

It stimulated interest and discussion in an area we are still learning about.

His work has identified an area of our vulnerability methodology that needs broadening because it did not consider all possible probabilistic outcomes.

The work familiarized us with the decision-making research in the business area.

Work was done that could not have been done without the extra manpower provided by the Associate.

Dr. Moorthy made a number of recommendations for Laboratory programs. However, his actual contributions were limited.

Dr. Loy's work allowed us to become familiar with various computer games that support decision-making research.

It helped us understand both how to manage software.

Introduced awareness of applicable new approach.

Furthered important research.

He has expanded our capability to evaluate weapon technology in terms of aircraft sortie effectiveness measures of merit.

Dr. Day addressed truth maintenance and learning in large dynamic knowledge-based systems. These are fundamental issues which are of major concerns to our group.

Although I had not seen his final results I understand that they will define the role of hyperbaric oxygen in burn shock.

Was associated with pilot studies on solution to heat stress problems.

It has brought into the program a new tool.

It advanced research goals in the area of visual attention by ruling out static clutter effects.

He performed a preliminary research project which will be pursued here because it revealed an area of possible importance to training and equipment/display design.

The research performed was directly related to on-going projects concerned with the evaluation of color usage in flight simulation.

We are preparing two international papers on Fabian's work; an internal code is being modified according to Fabian's work.

Mission of FJSRL is to do basic research.

Developed new insight theoretically and incorporated new analysis technique.

Provided in-depth analysis and new insights into aerodynamic data.

He looked at some new radiations that we are considering for use with printed circuit arrays.

It allowed us to develop a chronic catheterization technique and animal model that we are now able to use in other investigations.

The research, if completed, could result in a procedure not presently available. Dr. Houk's work this summer has greatly facilitated this research.

Absolutely, increased mission capability, both in the Giardia project and George AFB problem.

By collating information scattered throughout the literature and previously unavailable in a collected form.

Greatly contributed to our image processing, LISP, FORTRAN interface.

Provided close review of two Image Algebra approaches.

We now have an ultra clear molecular beam deposition system to use in our 2306 program (in-house).

Computer modeling of two phase heat transfer.

Preliminary work was accomplished in new heat transfer techniques.

Dr. Patel was directly involved in developing an anti-cardiolipin assay which we will continue to use in our laboratory.

Characterization of reactive Fridel-Crafts intermediates.

Dr. Jones assisted in the modification of a cell membrane preparation technique.

It was closely related to our interest.

Associate applied Infrared Spectroscopy to several critical research activities in Branch.

We need micromechanical models for high temperature materials. His work will lead to development of such models.

By complementing our existing resources and aiding in the design of our system.

It pointed us to a right direction as far as high temperature ceramic - composites program is concerned.

Evaluated various synthetic approaches to high temp. resins.

It explored defect energy levels that affect IR detector performance.

Enabled me to pursue additional work which would otherwise not have been done.

This is the first detailed structural data we've had available on the specific materials we're evaluating.

His research effort provided a much better understanding of the structure property relationship of functional fluids.

He showed several problems we did not have time to work on.

Introduce new approaches to signal processing.

Dr. Greene worked in an area which is of great interest to this lab.

Work on unified camera calibration algorithms will contribute to all laboratories requiring this technology. Specifically it has had a major impact on our in-house project.

Dr. Tomiyama performed modifications to a part of the Tactical Decision Aid computer code which permit the code to be operated in a far simpler implementation.

Gave us insights into a new transistor structure.

Use and comment on all ADAS software.

The area which Prof. Kung is addressing is very important in the area of Integrated Switching.

Specific recommendations were made regarding suitability of turbulence models available.

The research topic was a problem that we have been concerned about but haven't had the manpower to address yet.

A new statistic was developed that is very important to the laboratory.

By completing a computer program which decomposes kinetic energy into a rotational and a divergent component.

Prof. Battles completely familiarized himself with our computer systems, and then was able to use these systems as tools for assisting me in complete reduction and analysis of data from a large experimental program conducted at Pennsylvania State University.

Dr. Christian left us with an operational generator of trumble coherent light in the infrared. An invaluable tool, not available commercially.

Don's work gets us off to a good start with our new UV camera.

We had not used two modules in our computer cloud model - Pat used them and evaluated their performance.

He gave us some new insights that we didn't have before his visit.

We are preparing two papers for publication in journal.

We have specific tasks to understand variations in the solar atmosphere as a function of the solar cycle. The line asymmetries measured by the associate form an important data point for this project.

For example, fresh perspective on computational grids contributes to alleviate artificial boundary problems in computational meteorology.

Of value in future balloon borne lidar research.

He performed work that an in-house person would otherwise have had to undertake.

A new contractual work unit will be expediated by about two months plus.

His work has potential in control system design for supermaneuverable aircraft and hypervelocity aircraft.

His literature search in area of compressible turbulent boundary layer separation on rough surfaces will help in the selection of tasks in this area of research.

He familiarized us with the need for planning a program so that the data acquired can be effectively analyzed using statistical methods.

Providing more confidence in the adequacy of our chemical models.

We are able to expand our research areas. With our manpower limitations we could not do without this program.

FIB has a basic research task in dynamics and control of large space structures and Dr. Becus's work fitted with our plan.

Thermal-mechanical coupling is expected to play important role in Air Force projects Dr. Young's work is a good starting point for continued research.

Dr. Eastep's work in structure-control synthesis contributed to the goals of basic research in this area.

The simplification of large systems is an integral part of the control design.

Conducted a preliminary research in the area of unsteady flow control.

Dr. Murty began an exploratory research topic which our organization currently does not have the manpower to handle.

By illustrating an alternate approach to incorporate flying qualities requirements into preliminary design.

His research study was directly relevant to an area of major concern in our overall program. His results were clear and understandable and reasonably definitive.

He investigated an area of individual difference that may be of importance to the Air Force, but one which had not been addressed in our lab.

His work improved a pilot selection test.

By providing a better understanding of processes that could be occurring in combustors.

He initiated improvement in our Monte Carlo calculations.

Increased Lab's information on high temperature tube properties.

Dr. Ho's efforts on composite aluminum and high strength conductors has started an in-house effort at APL with great potential.

On 6.1 research program has been greatly enhanced.

Quantitative roughness of turbine blades.

Helped validate use of ATB Model for natural human motion.

His work in applied statistics provides a significant variation on the analysis of data from paired comparison designs.

Implemented mechanical head/neck dynamic response testing program.

He developed a close loop control system that improves the response of the G-suit valve.

Extensive analysis of expert system - but not really research.

Collected data on non-verbal behavior in group problem solving. Reviewed and recommended designs for teleconferencing research Lab in command and control.

Excellent study, part of results mentioned at recent conference.

7. Would you classify the summer effort under the SFRP as research?

YES - 131

NO - 4

Comment:

Research papers will result from the work due.

Numerous research studies were performed.

Several research projects were completed and one will be published.

Researched analytical techniques available to resolve USAF-contractor dispute.

Automated calibration of tracking radar system techniques required effective research.

Study.

Without question.

The approach taken by Dr. Hadlock was very original.

Some very fundamental concepts and ideas were examined and put to use.

Exploratory of Basic.

USAFSAM computer resources have become outmoded.

Project to which he was assigned is state-of-the-art in artificial intelligence.

New concept of AI were combined with simulation application.

Work of this type has never been done before. It expands the state of the art.

Work was in direct support of our in-house OSR task.

His work was more of a review of the state-of-the-art and did not involve new research.

New analytical methods are being developed.

Truth maintenance and learning are basic research issues in the AI business.

Animal research.

He tried some procedures that didn't work before he produced a successful approach, and the work can be expanded.

Very much an experimental research project.

Bridged gap between experimental and analytical areas.

Quite involved analysis, new electromagnetics problems.

Clinical research with possible operational application.

The program developed has two directions; one is more applied research, while the other is more basic research.

Searched for better ways to run blood leads.

His work is fundamental to basic research.

The anti-cardiolipin assay and the LAK assay will be principally used for research.

Most of the actual research for this effort was done in the library.

Research is on cutting edge of new polymer development.

He has continued his personal research on the shear lag model and done extensive reviews and assessment of literature on micromechanical failure modes.

AI based process control using multiple expert systems.

A very useful short term research program with high pay off.

We expect one or two papers in leading research journals.

Dr. Tomiyama examined in detail the basic assumptions of the existing computer model, then developed analytic expressions to represent them.

The ideas Prof. Kung is coming up with and implementing has not been done.

Research with development to practical application.

The effort was directed at understanding "state of the art" in atmospheric optical effects.

A set of original data, yet to be fully analyzed was obtained.

But only in part, because of scheduling problems (ours) he was unable to carry on things both he and we wish had been possible.

Basic research on slope flows.

He got a new research topic started.

The project was basic research into the solar gravitational red shift and changes in solar rotation that should provide understanding of how solar convection and rotation vary with time.

Free investigation by Associate.

Applied research.

Basic research. Much needs to be done before considered for implementation on real systems.

Performing a thorough literature search and synthesizing the results is an important step in performing research.

It was the preliminary phase to real research.

This ten week program is an excellent stepping stone for formulation of future research plans.

It is an excellent starting point for expansion of research in the area to address Air Force problems in space.

It constitutes the necessary preliminary work on the research.

It gives an opportunity to the faculty to formulate problems for future research.

He conducted from experiments with Air Force recruits.

Research of the highest quality.

He had three problems of direct Air Force relevant research.

Definitely. Original effort in tubes degradation properties.

Limited some of effort for completion in 10 weeks.

It was an extension to a technique for analyzing the results of research experiments.

Developed testing procedures for research program.

It was a successful research effort.

8. Was a Graduate Student assigned to your group this summer?

YES - 54

NO - 81

If so, did this enhance the research productivity?

YES - 43

NO - 3

Was it an administrative burden?

YES - 3

NO - 43

9. Were your relations with the Associate satisfactory from a technical point of view?

YES - 133

NO - 2

Suggestions as to how they might be improved:

Sometimes his level of expertise exceeded my comprehension. An information exchange either by phone or in person prior to the start of the SFRP would be beneficial to both parties.

More time in program.

Look forward to continuing that relationship.

Wish I would have had more time.

Need closer coordination between associate and this laboratory prior to his arrival.

Greater lead time needed as to who will be selected and assigned.

A security clearance prior to arrival would have been an asset. A pre-reporting visit of longer duration than one day would have been beneficial in selection of a research topic and work area.

Couldn't be improved.

We had weekly, lengthy productive conferences (he worked off-site in San Antonio).

Provide the Associate suggested areas of study, along with document references, prior to his work term.

Technical relations with Dr. Day were splendid.

No improvement needed. He was very communicative.

No improvement is necessary. We had a very close professional arrangement and discussed aspects of the project very freely.

Need to follow-up with mini-grant! Planned to continue 6.1 funding in 87 but he needs more!

Accomplish priorities as we set them. As it was, the top priority task was not finished although substantial progress was made on second priority.

Dr. Patel was a superb technician. We perhaps could have better taken advantage of his capabilities if we had known more about what his capabilities were.

Never assign a summer faculty member to someone without prior notice.

A longer stay would have helped.

Better background in AI.

Let him stay all year!

They were superb.

Time is the essential limitation. If we could expand the length of the program - 10 week in the lab and additional time at the faculty member's institution - it would be more effective.

Frequent technical exchanges bring scientific issue into sharp focus.

Both were excellent participants, well qualified, motivated and able to work with little supervision.

I don't believe our relations with Jorge Mendoza could have been better than they were.

Very good relationship. Could not be improved upon.

My personal time was largely spent in starting numerous contracts this summer and has not been beneficial in sharing experience with Dr. Ho.

10. Do you think that by having a Faculty Associate assigned to your group, others in the group benefited and/or were stimulated by his presence?

YES - 126

NO - 9

Comments:

Dave was particularly helpful in instructing one of the undergraduates in the lab. Some of his work has stimulated a new research topic.

Some of Dave's work has resulted in beginning new research projects in the area in which he was working.

The work done was in collaboration with other researchers here, increasing everyone's total productivity.

Interesting, especially for my young lieutenants.

He helped mentor and newer people in the project area.

Not only did they learn a lot, but now everyone wants a "slice" of this technical area.

Other engineers were encouraged to take graduate courses. Technical discussions were stimulated.

Good interaction with other members of office.

Dr. Morton gave several lectures to staff educating them about model and theories supporting it.

Associate performed research involving other investigations. They were impressed with the accomplishments.

They enjoyed the exchange of information.

Because the project they were working on was too far removed from the "real world" of our daily business.

Project was not related to any current effort.

Absolutely. Dr. Hung provided a tutorial presentation on statistical methods for the entire office. He also gave a briefing which summarized his research.

Professor Jones presented a series of technical seminars that were well received and attended by AD scientists and engineers.

To a limited degree, one other person besides myself had regular technical discussions.

His previous background on EGG data collection has stimulated other doctors in the group.

Very stimulating technical discussions took place and the associate presented two briefings on his work to the Branch.

All people involved were stimulated by the enthusiasm/expertise shown by the associate.

Benefit is primarily to our in-house computational fluid dynamics research team.

Difficult to say; he worked alone.

Project staff requests summer professors for foreseeable future.

Grant to continue work in the same specialized area.

Technical discussions generated by the presence of our Associate as well as others were extremely beneficial to our program here.

Very little, Dr. Moorthy tended to stay to himself and did not interact with the group very much.

Dr. Boggs interacted with all of the branch members.

Dr. Loy interacted with most branch members.

Several members became quite involved and broader areas were considered.

Dr. Sivazlian conversed with most of the group for inputs to his work.

I think many in our group benefited from the informal discussions with Dr. Day. He also gave two well attended seminars which stimulates some lively technical discussions.

Dr. Whidden was always willing to sit down and discuss his prior research work with members of the division staff.

Some more than others.

Dr. Moyer had ample biological discussions with members.

Dr. Wooten in particular has expertise in many areas of visual science and was of benefit to the laboratory in general.

Fabian is a dynamic person who can incite active research.

Provided new point of view to stimulated greater interactions and new thought processes.

Provided interactions and fresh point of view not normally existent - stimulated new thoughts.

He is a fine example of a dedicated researcher. People respected this.

The new or different approach to similar studies stimulated our staff.

We all learned a little micro.

Provided very positive interaction.

Breath of fresh air - very valuable program! Important to continue!

Interest in work by outside lab.

One problem is that our technician staff was insufficient to support the associate.

The stimulus of Dr. Patel's presence has led to further staff involvement in research projects utilizing the assays which he developed.

There was good communication facilitated by weekly group meetings.

Dr. Jones' research interests are not related to most of the research currently underway in VNC. Her emphasis has been ultrastructural studies of schistosomes, and we do not deal in parasitology or EM work.

It's very essential to have influx of new people.

Use of infrared spectroscopy enhanced research efforts on-going.

University researchers bring different concepts to the research effort. In this case, our planned research activity has been expanded considerably with the help of the associate.

He was willing to share his knowledge with group members in fields such as linear programming and network theory.

Having someone with fresh ideas and daily contact with others in the group were quite stimulating and beneficial.

It gives us access to people and projects that we would not have otherwise.

Who can tell?

Dr. Stock interacted easily and at his suggestion, he gave a seminar series of three lectures on x-ray topography which were very useful.

Dr. Paige's excellent approach and technical skills provided both an excellent example as well as "training/education" to others in the group.

Dr. Greene was of great assistance to several people in my group.

There was indirect benefit to the group, however, the Associate and I worked very closely and intensely together.

Dr. Tomiyama provided a fresh, analytic look at several of our key problem areas.

Did not work with any other people in the group, however did brief his work to the directorate.

Dr. Truman was able to discuss various experiments in progress and make suggestions.

He was very open and always willing to share his ideas with everyone.

A source of new concepts, Dr. Gupta helped on other projects to which he wasn't specifically assigned.

Everybody who was in daily contact with Dr. Ahlquist shared with and learned from his knowledge through technical and scientific discussions.

There was some very good discussions. Yes, it has been my experience, generally, that faculty associates stimulate the group they are assigned to.

He had useful comments and contributions to several scientific projects.

We had a new Captain who learned about our computer system and numerical model by interacting with Pat.

It is important to have some new and different points of view expressed, and others also profitted from the experience.

Several members of the solar research branch worked with Dr. LoPresto and established collaborative programs.

A qualified yes possibly due to physical separation of offices. Apparently strong interaction existed among Associates due to closeness in living quarters.

Of value to several persons in lidar group.

Little opportunity - others extremely busy with field work.

There was limited interaction between the faculty associate and other members of our group. Most of our group are not involved in basic research.

Personnel in other groups were also exposed to statistical analysis capabilities and were sensitized to the need for planning the data to be gathered so that statistical analysis can be effectively performed.

Not in this case. Dr. Yip's efforts were not in the area most of us is involved in.

Definitely this is a positive contribution because young engineers can discuss problems with the experienced faculty.

It is an excellent opportunity for young engineers to grow into research.

Other members of the group were able to interact with the researcher and to get his opinion on a variety of technical issues.

Bring a new perspective of basic understanding.

Dr. Murty interacted with several members of our group. All comments concerning Dr. Murty were positive and enthusiastic.

Both sides benefitted from many technical discussions.

His approach was novel and creative and systematic; he interacted freely with us about what he was doing. I believe that this was "motivating" for the staff.

There were many formal and informal exchanges of ideas and information.

The junior military benefited greatly from Dr. Ho's laboratory experience and can do attitude.

Scientific exchange is always stimulating. Different viewpoints can but increase our growth.

A new set of insights is always beneficial.

Helped train branch personnel on research approach.

Dr. Rattan increased our understanding of new state-of-the-art technology advances in control theory.

Dr. Wellens is a source of a dazzling number of good research ideas. Picked up instantaneously on the interplay of seeming diverse research programs and facilities.

His knowledge and enthusiasm were helpful.

11. Do you feel that introduction to each other, together with the summer work experience and performance could form a sound basis for continuation of effort by Associate at his home institute?

YES - 124

NO - 11

If yes, how?

We are continuing to collaborate and should produce three research papers this year.

We are continuing to collaborate and should be able to produce two research papers over the next year.

We are continuing to collaborate. Two joint research papers should result over the course of the next year.

The problem being worked is general enough to be investigated by graduate students or by Dr. Kolitz at his work station. The computer programming and access is easily achieved.

Follow up R&D in same related areas.

This would be terrific and possible.

By advancing to the more realistic problem.

Dr. Quimby has a new area within which to educate his students. I will do everything possible to maintain professional contact with him. The summer's work has opened a new area very worth of further work (and funding!).

Participate in analysis of experimental results.

Demonstrated capability to accomplish the work.

The effort started on the summer program does not require special hardware to be continued.

Doyle knows the type work we do and can better advise his students and plan the courses.

The work he did here laid the ground work for many follow-on projects.

Additional work is needed to improve model. Dr. Morton now understands it and "rate of return" for other efforts is greatly increased. Otherwise, new person would need to duplicate her start-up.

Many expressed an interest to meet each other and exchange information.

If by "each other" you mean the other associate the answer is yes since they were working together before. If you mean the BRMC staff the answer is "no" - their research is too theoretical.

He was introduced to several additional problems we are interested in.

A continuation of his research through the AFOSR is anticipated; and his association with a nearby university will permit an avenue of further use as a consultant or part-time employee.

Possibly.

Dr. Claiborne and myself have already finalized an outline for the work we would like to perform as a follow-up of the work accomplished this summer.

Dr. Hadlock's work is close to a breakthrough; further effort would be beneficial both to him and the Air Force.

Through continued analytical research and consultation.

The work begun here can very easily be continued at his home campus.

Associate could be used as consultant or contractor for small efforts.

Direct related graduate student activities as well as his own research.

We are planning a continuation/will request mini-grant.

Introduction to the problem could stimulate interest in pursuing grants.

While Dr. Boggs was here, discussions were held about future research projects.

Through our post-doctoral program.

Especially if he gets mini-grant.

We intend to pursue avenues for funding his continued work on the subject.

Highly recommend a AFOSR mini-grant. Also Dr. Day was invited to submit a white paper to us.

Dr. Whidden plans on continuing his work on burn shock and hyperbaric oxygen.

Associate expressed interest and has most facilities.

Dr. Moyer could continue the development of the cell line.

Dr. Wooten will apply for the UES/RIP award to continue collaboration in the area of color contrast.

Through mutual research proposals and future summer students.

Provided basis for new research.

I certainly hope he gets a mini-grant, we want to work with him.

Provide additional financial support for the next phase.

The work is not completed and needs more research before becoming an accepted laboratory procedure. The additional research could be done at the associate's home institute with other funding.

Through a mini-grant continuation.

Performance of part of the research at USAFSAM.

By the further development of software interfaces.

Study Li-LiH mixtures and properties.

Continue packed bed heat transfer.

The techniques learned by Dr. Patel will be useful to him in his home institution and we expect to further collaborate on projects pertinent to his visit with us.

Associate intends to spend academic year 1987-8 here.

Dr. Jones intends to submit a research proposal based on her work in the library this summer. Beyond that, I doubt that there will be much research interaction.

Interaction with him and his students (as future recruits).

Within limits of institution and time of associate, research could be continued on some phases of research at home institution.

He has been introduced to our thinking and approach in a developing research area. He has had first hand observation of our analytical and experimental activities.

The application and extension of the research addressed this summer.

The summer program allows the associates to think of the research problems which are of major concern to DOD and Air Force. Hopefully the associates devote additional time and effort for improvement or refinement of the materials/processing and the like of interest of AF.

Anticipated mini-grant.

Continuation of sample examination by Raman spectroscopy.

He will continue to work for me if we provide money.

We plan to send him samples and coordinate research.

Provided the equipment and computer support are made available the associate does not have the necessary equipment at his university at the current time.

If he is interested in further work we could identify the areas of our interest.

Dr. Greene's experience with research this summer will allow him to continue this work.

New research problems have been identified during his efforts at AAAT.

This was our first direct introduction to the application of a Systems Science approach to some of our computer models. The technique works, and Penn State has expressed interest in continuing research in this area with applications to Avionics Laboratory problems.

By continuing his modeling of the transistor.

Through application of our methodology in their research environment.

Mini-grant and post doc. efforts.

Further development of the turbulence models should be continued.

He plans to continue the research in greater detail and is looking at possibly coming back next year for a sabbatical from the University.

Improved mutual understanding of Air Force science needs.

By continuing and extending to research initiated by the program.

The summer relationship has been extremely good and much has been accomplished. There is a great deal of modeling on C_n^2 , the atmospheric structure parameter, left to be done. Since Prof. Battles is quite familiar with the problems, he is well suited to work on these problems at his home institute.

Dr. Christian now has the resources to continue his investigation into VR coherent light sources.

Don understands both the instrumentation and our long term goals with it. There are studies we see need for but are unlikely to accomplish in-house.

Pat is already discussing the mini-grant program with his institution.

Through a follow-on mini-grant or possibly a contract from AFGL.

He will do calculations based on experimental work at AFGL.

The Associate will use data collected at Sac Peak and data I will give him to continue studying solar rotational changes.

The Associate should build on results of the summer research and focus on concrete, identifiable problems which are logical extension of the summer research.

Through knowledge of a new area of research using his skills.

In general yes. The current problem has been solved.

Groundwork laid for making progress efficiently.

By establishing a joint effort in which the AFWAL wind tunnels are used to study fluid mechanics phenomena with data analysis and theoretical development being performed at the home office.

Analysis of in-service durability data for F-111 and F-16 transparencies would be one of several worthwhile candidates for such work.

Dr. Yip has expressed a desire to continue to look at the sensitivity of the chemical model.

In almost all cases the faculty continues work in the area by assigned these topics to graduate students and increasing their own effort.

The faculty brings to the attention of graduate students the current problems of interest to Air Force.

The faculty continues work in the area - brings graduate student and interests them in the area.

This is the best way to bring complex aerospace problems to the attention of University Faculty and Graduate Students.

The researcher uncovered several new problems during the course of his summer visit.

The research topic chosen has the potential for a great deal of follow-on work.

He is submitting a mini-grant and is much better qualified to study flying qualities.

He is continuing to analyze data collected and may propose future collaboration studies with AFHRL/AFOSR Grant Program.

He can continue his research having formed the foundation during his stay.

Through Air Force contacts.

It was demonstrated to him how collisional physics relates to practical problems.

Through the second phase funding and sponsored research efforts.

Develop methods for collection of spatial kinematic data for AAMRL model applications.

Possibilities for joint research were discussed.

Interests are highly related, but some continued work at our Lab facility would be highly desirable by associate.

At Wright State University, Dr. Rattan has organized some professors together to further research this effort.

Issues of social distance in distributed problem solving could ideally be researched at Dr. Wellens' campus.

I hope we can continue our collaboration.

If no, why not?

This topic is very domain specific.

The work he did was too generalized - continuation of such work can be accomplished in relevant specific areas more readily via computer program usage.

Dr. Moorthy's project did not produce a product that has significant potential for future work in the area.

He plans to move to a different university. His plans are unclear at this time.

The biggest limitation would be his lack of access to a population of people with piloting experience.

The project was short term. The results obtained do not suggest that further efforts are warranted.

Prof. Doria has too heavy a teaching load for him to continue his research.

Evidently, Cedarville College does not have an administrative mechanism that would permit continuation of the work at Dr. Flentge's lab.

Dr. Tacker's familiarization with AI is still somewhat cursory - not adequate to perform research.

12. One of the objectives of this program is to identify sources of basic research capability and availability to the USAF. On a scale of A to D, how effective do you think this program will be in that respect?

(high) A B C D (low)
A 79 B 48 C 6 D 2

13. Also, please evaluate:

A (high).....D (low)

Opportunity to stimulate group activity
Professional association
Program administration

A 76 B 47 C 8 D 3
A 94 B 34 C 6 D
A 61 B 56 C 14 D 3

B. ADMINISTRATIVE ASPECTS

1. When did you first hear of this program?

1984.

HRL status quo.

Several years ago.

Past years of associate involvement.

HRL status quo.

Have heard it mentioned in lab on and off for several years.

15 May 1986.

1982.

1986.

Summer 1985.

When I first came to the LMC.

Six years ago.

10-15 years ago.

10 years ago.

When assigned to BRMC - September 1984.

Winter 1982.

1981.

Early 1970's.

I have managed this program for several years.

Spring 1986.

Approximately 10 years ago.

1984.

When I was assigned to the Associate.

Receipt of resumes.

Two years ago.

February 1986.

Its first year of existence (about 1975).

During indoctrination.

1983.

Right before Dr. McDonald arrived.

At its conception.

Early in 1986 when informed of program by Dr. Lou Blouse of Brooks AFB.

Convenient. From a co-worker who had seen a circulating list of the applicants and their areas of interest.

Two years ago.

2. Were you involved in the screening and prioritizing of the faculty applicants for your lab?

YES - 82

NO - 53

If yes, do you have any suggestions for improvement of the procedures used?

More information could be distributed on the work done at the lab to potential candidates.

There needs to be better correlation between discipline terminology and actual discipline performance, e.g. does Artificial Intelligence experience relate to Human Behavior or to Weapon allocation. The use and techniques are quite different.

Before a graduate student is accepted by UES, we need to discuss that student's potential assistance with the professor before a student is nominated by the professor otherwise, students are appointed who should not be part of the program.

Did have an opportunity to make a "case" for Dr. Quimby with the lab director.

Start selection process earlier.

Provide the university system with information on the program.

Resumes should be complete.

At present, the program is being run locally by a single individual who affords no opportunity whatsoever to screen or prioritize applicants. My efforts to recruit applicants was entirely done in an independent manner with no formal request. Host investigators should be included in some fashion in the selection process.

Would prefer a larger selection (better advertising?).

AMD labs try not to compete with each other; occasionally awkward.

Works pretty well; the AMD laboratories try to be careful not to compete with other.

Better local coordination - earlier division planning of coordinator.

More lead time.

Give us more time for applicant review.

Dr. Jones was not among the people whose records were submitted for our review. She was assigned to me in the first week of July with no warning to either of us. I recommend that in the future, only approved and accepted applicants be assigned to positions.

Need to get information back to screeners as to status much sooner.

I think you do the best you can without burdening me.

Try to have all applications arrive together - this simplifies prioritization.

Less paperwork - fewer questionnaires.

The in-laboratory 'sorting process' can be very restrictive. If we had relied on it alone we would not have had an Associate this summer.

The Associate did not make a pre-trip to the site.

It is reasonable as it is last year there was too much involvement from lab management which resulted in some confusion - of course it was partly because of expansion.

I believe it is a good procedure as it is.

(Involved at Division level) Get information to Branch/Group level early enough so candidates can be encouraged to apply.

Greater publicity is needed to ensure more qualified applicants.

The procedures are satisfactory.

No, it seems to work well.

Need to see applications earlier and in one package-prioritization difficult otherwise.

3. How do you rate the importance of the expense-paid pre-program visit to the work site?

Essential	- 102
Convenient	- 27
Not worth expense	- 6

Please add any comments:

The summer visit allowed us to set up research objectives, give the participant background information, and insure that all supplies would be ready on his arrival. The visit let the participant begin research immediately, saving a good three weeks.

Dr. Hoffman was able to hit the ground running. His pre-visit allowed him to do some reading, thinking before arriving to work.

This could clarify the job requirements and also the skill application. It would result in mutual acceptance (or not) and prevent disconnects once the effort starts.

Only way to get a running start on a short program.

Enables background work to be accomplished prior to the on-site work.

Time is well spent, especially in locating housing for summer tour.

It's an intensive 10 week effort - and 10 weeks goes fast. They need to hit the ground running and should not have the hassles of finding a place, etc.

Gave Dr. Morton a head start.

Helps associate to prepare for research.

To meet and discuss tasks of mutual interest is essential to planning and provides the professor an opportunity to arrange for housing.

How else can the details of the project be worked out to the point that necessary supplies can be identified and ordered in time.

Provides head start needed for a 10 week program.

Should not wait until he is on-site to plan problem details.

Housing/transportation/area familiarization.

I consider this essential in order to orient the Associate and to make clear what the problem and objectives are.

It gives the laboratory and the scientist an early opportunity to determine what meaningful research can be done. Since the summer work is so short (10 weeks) this is very important.

Without it I don't think I would have participated.

Convenient to the 2nd summer, Essential to the first.

I was not aware of this pre-program visit. Such a visit would enhance an early understanding of the research area and the needs for the ten week program.

Probably allows the investigator to do some homework to better prepare for the assignment.

The investigator would be better served if he had formed a better idea of the equipment we had available prior to arrival.

Let the associate come to his summer sessions 2-3 days early and reimburse him.

10 weeks is a very short time - a pre-visit helps to overcome this problem.

Stimulates thinking and reduces start-up time. Gets administrative matters (housing, etc.) out of way.

This was the time when the proposal was developed, discussed, and hammered out.

I was able to present the background of the project to Dr. Houk. It allowed him to do some background reading into the subject before arriving.

It gives the professor a chance to do preliminary literature research.

Gave us a head start on ordering, literature review, etc.

Much time would be lost on details on first arrival of associate.

Did not make a big difference in this case since we were already in contact with him. Don't drop the idea!

Laboratory tour necessary to allow associate to plan.

Faculty needs time to investigate facilities, plan experiments.

On the pre-program visit it is important to identify the potential capabilities of the Faculty Associate and to clarify expectations of his visit with us.

Some form of interaction is necessary. A pre-site visit would be helpful, but a phone call might do as well. This is probably more important for new members than for returning faculty.

Vital for coordinating program and for associate to make plans for housing, etc.

The associate has the opportunity to get familiar with the work place and to discuss the work plan for the summer.

In this case, since Dr. Schneider is at University of Dayton it was not used.

For an out-of-town person with a technique new to us, the visit paid big dividends in allowing preparations to be made that increased productivity.

It permitted the associate to both understand the area he was going to conduct research in as well as permit the necessary preparation for the agreed upon research approach, etc., to be completed prior to his assignment.

Problem definition are necessary to maximize a 10 week effort.

We really can't do without that visit.

Prof. Zobrist was well prepared and ready to start with his project the very first day.

Prof. Truman was already located in New Mexico.

It gives the Associate a much better picture of our program which allows him to better select and define his research topic before arriving for the summer. Thus, when he shows up, he is much more ready to begin work.

The program is an efficient and effective way of improving and promoting communications and enhancing research activities at both ends.

Convenient. It is beneficial in setting up an outline of the research effort prior to the start of the program.

In order to prepare properly for an experimental project I will always need to discuss many topics with the associate prior to project.

In this case, we formed a basis for defining a project of mutual interest.

Mutual exploration before the program starts enables both the faculty and the institution to prepare for the program.

Since the program is only 10 weeks long, outlining the details of the effort prior to the start of the program is essential to a successful completion of the task. A pre-program visit ensures that this is accomplished.

Visit was essential in providing Dr. Lee with initial information on aircraft transparency issues, to include documents for him to review before the start of the effort itself.

"Essential" may be too strong - "convenient" is too weak. We need a chance to orient the researcher before he comes.

At least in majority of the cases the visit provides good opportunity for formulation of research problem and some understanding of our facilities.

This visit provides opportunity in research problem and understanding our facilities.

Good opportunity for advance preparation in view of short duration of stay.

It permits the Associate an excellent opportunity to see the lab and to make arrangements for housing.

Project and orientation is critical to the success of this program.

Actually, between convenient and essential. Some sort of contact is essential before the summer period begins.

It allowed associate to design and program experiment before coming to the Lab.

Prepares the scientist for a productive summer.

Essential, the visit enables us to determine the candidates potential for research effort.

Most important feature. Without it, the shortness of the program (10 weeks) prevents any significant work.

In this case allowed us to prepare a productive experiment in which Dr. Wellens participated. Allowed us lead time so that Dr. Wellens could complete facility recommendation in 10 week window.

10 weeks are short and pre planning is essential.

4. Considering the calendar "window" of ten weeks (limited by varying college and university schedules), please comment on the program length. Were you as a team able to accomplish
- | | |
|-------------------------|------|
| more than | - 26 |
| less than | - 19 |
| about what you expected | - 40 |

Comments:

Ten weeks is an extremely short time, however, it provides a good indication of the work value. If the work is valuable, it may be continued through a grant and subsequent SFRP as in the case of Dr. Kolitz.

Only because of advance planning and pre-visits.

Complete program required experimental data which could not be obtained in time allotted. Better planning on our part would have prevented this.

Longer would be beneficial.

The 10 week schedule is short when considering basic design.

Care must be taken to select projects that can be completed in the short time the faculty member is available.

Mostly because Prof. Lyons worked nights/weekends to get the job done.

Window is adequate for the task.

Could be two weeks longer.

A longer period is desirable; however, the mini-grant program is an avenue for continuation of promising research.

Ten weeks is far too little to accomplish any major research, say enough for a full publication, but if one keeps in mind this limitation it is possible to complete many projects of narrower scope.

Because of pre-program visit mutual derived schedule allowed realistic accomplishments.

Tight schedule for the size of his task, particularly when scope was expanded at end of 6th week.

Prof. Schori brought new skills to the project team.

Dr. Keener's lack of experience in control theory reduced this "window" to effectively 6 weeks. Four weeks were spent reviewing.

The first term was mostly a learning experience. A second term would be much more productive.

It is easy to plan more than can be accomplished. Writing the final report takes one to one and a half weeks away from the total time.

Prof. Zmuda was remarkably diligent in bypassing our bureaucracy.

More could be accomplished with prior planning on the part of the faculty associate.

More lead time planning could help.

The summer schedule should allow flexibility, i.e. 8-13 weeks.

We encountered difficulties with a laser system, which required repairs and severely limited our efforts.

Equipment problems hampered the efforts.

Two additional weeks would have proved beneficial.

He accomplished a great deal by working nights and weekends. He did quite a spectacular job. I think the program should be lengthened.

If both groups are brand new and unfamiliar with each other, the time is insufficient. In this instance, the groups were complementary and brand new.

I would like to see a little more time; however, I realize the limitations.

Due to the short time frame it is impossible to accomplish a great deal.

Ten weeks is certainly too short for basic research. About right to look at a particular applied research problem.

Outstanding accomplishments.

Again, we need to have extra technician support next time.

Faculty member was here only 8 weeks because of late start. Because there was no great amount of laboratory work ongoing, this was acceptable. At least 10 weeks would be needed if there were several projects in action.

It takes time to develop momentum.

Since we had an urgent need of thermo dynamics calculation of refractory ceramic-ceramic composites we were able to accomplish considerably more than it was expected.

It goes quickly, but the 10 week period give the faculty some flexibility in their schedule.

10 weeks is short, so associate must work hard and be rather bright to accomplish anything.

The early visit helped.

Dr. Paige's enthusiasm and diligence demonstrated by his taking work home with him enabled him to go much further into proposed mechanisms of reactions than had been anticipated.

Additional time would have been welcomed.

Completed a paper for presentation at COSPAR XXVI and completed and reported on Pennsylvania State University Program data and analysis which was extremely good for just 10 weeks.

10 weeks is short to perform research. Plenty of time to introduce AF research needs to new people.

We accomplished less than we set out to do in our original plans; ten weeks really wasn't enough and our (AFGL) schedule problems did not help.

The duration of the program is very short, and both parties must be careful not to tackle too large a problem.

One should tailor the program to suit the time available.

Ten weeks seems sufficient for this type of interaction.

More time would be very helpful. Perhaps if Associate could spend spring vacation here, to start the remaining summer weeks could be used to better advantage.

The faculty associate has done the "extras" that are sometimes required to complete a project on time.

Had little knowledge of Dr. Lee's field (statistics), so had no solid basis from which to estimate what would be accomplished.

Addition of two more weeks may help in writing the report and preparing proposal.

This was because Jorge arrived with a plan for research already well laid-out and "hit the ground running."

Dr. Flengte's experience contributed greatly to the more than expected achievement of the effort.

Additional program length would be beneficial.

5. Would you desire another Faculty Associate to be assigned to you and/or your group/division?

YES - 132

NO - 3

If no, why not?

The work the Associate did for me was Projects Branch - type work - better suited in Projects Branch.

Not for pure theoretical research.

6. Would you desire additional Graduate Students in this program?

YES - 106

NO - 15

N/A - 14

7. Should the Graduate Students only be assigned to research with the Summer Research Faculty Member?

YES - 50

NO - 67

N/A - 18

8. Should Graduate Students continue to be assigned without Summer Research Faculty supervision?

YES - 68

NO - 38

N/A - 29

9. Other Remarks.

We have employed Dr. Kolitz for the past two years and feel that our return on this investment has been worthwhile.

Shorten your questionnaire.

Overall a very positive collaboration. My only difficulties were logistical, i.e., trying to beg/borrow/steal the equipment necessary for the work. Other colleagues in the lab remarked "The program is a good idea, but I (we) don't take advantage of it because it's so hard to support these people". Suggestion - Modify the program such that the participant "comes with" a small pot of funds to purchase instruments/equipment. I would be happy to amplify on the above if someone cares to call.

Graduate students get an excellent chance at subsequent employment because of the extended contract.

It is a good program.

The failure to acquire a clearance for Mr. Brown prior to his arrival at AFWL severely restricted the projects I had planned for him to work on. His clearance did not show up until the last week of his assignment.

We have had several summer faculty members do work for our center, all have made significant contributions to our mission.

Excellent program. Would like procedure for follow-on work (mini-grants) improved; don't really know how/why grants are selected.

Prof. Lyons was one of the finest researchers and most productive researchers we've ever had.

Dr. Price made very significant contributions. He is very knowledgeable and a hard worker. I hope that he is awarded a continuation grant. The work has created a lot of interest and is very useful to the Air Force.

Dr. Chen is a very hard working individual as evidenced by his productivity during the summer (1 publication). His work is of great interest and should be continued.

In the future faculty associates assigned to the BRMC must work on projects directly related to our areas of interest as opposed to projects they have been personally pursuing.

BRMC will desire future associates work on current problems that is a 10 week period some results can be shown.

The Summer Faculty Program is considered a superb program for the professors, the graduate students and for the Laboratories. We wish to continue our yearly involvement with the university system participants.

Each year I hear the same complaints "yesterday I heard they're going to assign an Associate to my lab and I have no idea of what he/she wants to do or what I would like them to accomplish while they're here." The investigators who ultimately end up working with these people are given precious little opportunity to play a role in the selection process.

Good program! Wish a larger number of associates would apply to insure a good choice for selections - maybe more advertising is needed.

We would certainly like to see Dr. Catalano return and continue research in the cavity flow area. This is a critical technology. To the USAF and continued AFOSR support over the next couple of years would be ideal.

I have problems with the schedule which selects professors and then selects graduate students; complicates the processing of pairing professors and graduate students.

This whole program is probably the most valuable activity for our basic research activities during the year, given the efficiency of the program, the little time involved on my part, and the results from the faculty members.

Graduate students are of more benefit to the Laboratory if they work under our direction rather than the direction of a summer professor.

This program is extremely beneficial to the analysis support group in AFATL. We are a small group with very little funding. This program can provide us the help we need to develop methods beyond our in-house capability.

Could improve matching of associates goals/expectations of the particular lab.

Find ways to encourage more U.S. citizens to apply.

I would be most interested in having Dr. Houk return to complete his work.

Keep up the good work - Universal Energy Systems and OSR.

Faculty may have alternate ideas to tasks assigned to graduate student. Therefore, faculty and graduate student need to meet together with government task mentor.

In general, Dr. Patel's visit with us was profitable in the development of assays that will continue to be used here in a research, and we hope, in a clinical setting. There needs to be improved communication to clarify proper administration, personal expectations, in the availability of laboratory staff at our institution to make the faculty associate's visit as profitable as it should be. These considerations could have been better coordinated as they applied to Dr. Patel's visit.

Note that I have no experience in graduate students in this program and my remarks should be interpreted in that light. I cannot overemphasize the need to coordinate the assigned of summer faculty with the research colleagues. I have to believe that Dr. Jones might have spent a more productive and interesting summer if she had the opportunity to work with someone in an area she was more familiar with. I also believe that it might have increased her chances of getting a follow-on research grant for next year, which was one of her primary aims.

A great program! Congratulations to you and your colleagues.

There seemed to be some confusion about the technical interests of the applicants which caused many of the applications to be sent to the wrong research groups here. This situation must be rectified in the future. Also the remuneration is very poor. This could have a severe impact on quality applicants. The 10 week period should be extended as much as possible - the longer the better.

Good program - we need it and more of it.

Additional funds should be provided to increase the number of associates interested in the program.

This is an excellent program that contributes to the scientific health of the Laboratory.

Would certainly welcome the opportunity to have Dr. Paige work with my group again.

The number of pages limited on their final report may restrict the quality of the report.

Many thanks to the staff at UES for their help in this process. They went out of their way and performed an individual sorting of applications for us to find an appropriate individual for our work. Dr. Tomiyama's resume came out of that effort and he proved to be just ideal!

I believe this program was very good and look forward in acquiring another program next summer.

An outstanding program which rejuvenates the in-house staff.

In regard to question 8, I believe there are graduate students who are mature enough not to need any faculty supervision.

I was extremely pleased with the amount and quality of the work completed under the summer program.

My first exposure to this program has been a positive one. I look forward to continuing it.

Overall a good program and I recommend that it continue into the future.

Since most observational programs are computer intensive for data processing they offer a good opportunity to introduce graduate students to the real world of data handling.

Consider the program of considerable value based on a first-time experience - would like to participate again.

Advanced, mature graduate students can be very effective and the experience also valuable to them when assigned directly to us.

I have two comments; 1) It appears that most of the graduate students in good schools are foreign nationals. It would be beneficial if faculty is allowed to bring their graduate students even though they are not U.S. citizens. Several summer faculty told me that they did not bring their students because the students are on F-1 visa. 2) In my opinion, Summer Faculty program is effective if we bring young faculty who recently finished their Ph.D. They are usually enthusiastic and ambitious to learn and work hard. Such young faculty are generally, non U.S. citizens and hold green cards. Currently, we have to do too much paper work to hire such faculty. I suggest the procedure be relaxed.

Since the Summer Faculty Research Program is concerned with basic research, I think the 6.1 Project Managers should be encouraged to include this program as an integral part of their program - as a source of research and as a source of replacement personnel.

We've been disappointed with the visitor a year ago. We really didn't know, if anything, that grant is accomplishing. I'd like to see future work by Dr. Yip fall in the same category.

The most usefulness of this program is awareness of the research needs of the Air Force by the university faculty and stimulating environment in the laboratory due to the presence and work of the young faculty. The by-product of this program is the improved quality of young engineers applying for positions in the laboratory.

Discussions and working with faculty who are very familiar with the theoretical aspects of the problems in formulating sound basis for research.

Bringing faculty into research laboratories is the best way to stimulate and sustain the spirit on which research thrives. New people and new ideas are particularly important because of severe hiring limitations in the government. The most recognizable by-product of this program is the improved quality of young engineers applying for positions in the lab.

It is good for the laboratory as well as the Air Force because it provides an opportunity for Air Force to bring complex problems to the attention of the most knowledgeable community.

The Faculty member was able to structure their activity such that they benefitted academically to a better extent than we could have because of unfamiliarity with their capabilities--Would have been very time consuming for a staff member.

As much information as possible on experience, hobbies, grades, personality, should be made available to the laboratory advisor before assignment.

The program is a success. We really need these people who can contribute to our program. Apparently at no cost to our laboratory.

This is an excellent program and should be continued.

Some graduate students may be acceptable but I would like to screen these student out, first.

Let me repeat, Dr. Wellens is a stand-out in this program. The best I've seen. Continued research involvement in our programs would be highly beneficial.

Excellent program. Very worthwhile for research project and continuing research.

APPENDIX II

- A. Program Statistics
- B. List of 1986 Participants
- C. Participant Laboratory Assignments

APPENDIX II A

Summer Faculty Research Program

Sponsored by
Air Force Office of Scientific Research

Conducted by
Universal Energy Systems, Inc.

Program Statistics

Program Statistics

1. Applications Received (by Laboratory)

Organization	1st Choice
AAMRL (WPAFB)	9
APL (WPAFB)	23
AD (Eglin)	9
AEDC (Arnold)	3
AL (WPAFB)	6
BRMC (WPAFB)	1
ESMC (Patrick)	0
ESD (Hanscom)	1
ESC (Tyndall)	6
FDL (WPAFB)	11
FJSRL (USAF)	9
GL (Hanscom)	10
HRL/LR (WPAFB)	6
HRL/OT (Williams)	2
HRL/MO (Brooks)	10
HRL/ID (Lowry)	1
LC (WPAFB)	0
LMC (Gunter)	2
ML (WPAFB)	13
OEHL (Brooks)	1
RPL (Edwards)	2
RADC (Griffiss)	6
SAM (Brooks)	23
WL (Kirtland)	9
Totals	163

2. Number of Participants - 100

Number with Bachelors Degree	- 74
Number with Masters Degree	- 26

Program Statistics
Continued

3. Number of Participants at Each Laboratory

Organization

AAMRL	(WPAFB)	-	8	GL	(Hanscom)	-	6
APL	(WPAFB)	-	13	HRL/LR	(WPAFB)	-	3
AD	(Eglin)	-	6	HRL/OT	(Williams)	-	2
AEDC	(Arnold)	-	2	HRL/MO	(Brooks)	-	3
AL	(WPAFB)	-	4	HRL/ID	(Lowry)	-	1
BRMC	(WPAFB)	-	0	LMC	(Gunter)	-	0
LC	(WPAFB)	-	0	ML	(WPAFB)	-	11
ESMC	(Patrick)	-	0	OEHL	(Brooks)	-	0
ESD	(Hanscom)	-	0	RPL	(Edwards)	-	4
ESC	(Tyndall)	-	3	RADC	(Griffiss)	-	5
FDL	(WPAFB)	-	5	SAM	(Brooks)	-	15
FJSRL	(USAFA)	-	6	WL	(Kirtland)	-	3
Total							100

4. Discipline Represented - 30

Aero Engineering	-	4	Mathematics	-	6
Astrophysics	-	1	Mechanical Engineering	-	13
Biochemistry	-	1	Medicine	-	1
Bioengineering	-	1	Meteorology	-	2
Biology	-	5	Natural Science	-	1
Biomedical Engineering	-	1	Pharmacology	-	1
Ceramic Engineering	-	1	Physical Anthropology	-	1
Chemical Engineering	-	2	Physics	-	6
Chemistry	-	14	Physiology	-	1
Civil Engineering	-	2	Polymer Science	-	1
Cognitive Psychology	-	1	Psychology	-	12
Computer Science	-	2	Statistics	-	1
Dietetics	-	1	Structural Engineering	-	1
Electrical Engineering	-	9	System Science	-	1
Engineering	-	5	Zoology	-	2

Program Statistics
Continued

5. Colleges and Universities Represented - Total 57

Alabama, University of	- 1	Montana, University of	- 1
Arizona State	- 1	New Mexico, University of	- 4
Atlanta University	- 1	New York University	- 1
Auburn University	- 1	North Carolina, Univ. of	- 1
Boston University	- 1	Northwestern University	- 1
Brown University	- 1	Ohio State University	- 4
Clemson University	- 1	Ohio University	- 1
Colorado, University of	- 3	Oklahoma, University of	- 2
Cornell University	- 1	Pennsylvania State Univ.	- 2
Davidson College	- 1	Purdue University	- 1
Dayton, University of	- 2	Rutgers	- 1
Dickinson College	- 1	Southern California, Univ.	- 1
Duke University	- 1	Southern Mississippi, Univ.	- 1
Eastern Kentucky University	- 1	Southwest. Louisiana, Univ.	- 2
Florida State University	- 2	State University of New York	- 1
Florida, University of	- 5	Tennessee, University of	- 1
Georgia, University of	- 1	Texas A&M University	- 2
Howard University	- 1	Texas Southern University	- 1
Illinois, University of	- 1	Texas, University of	- 2
Indiana Univ. of Pennsylvania	- 1	Toledo, University of	- 1
Iowa, University of	- 2	Trinity University	- 1
Kent State University	- 1	Tulane University	- 1
Kentucky, University of	- 2	Vanderbilt University	- 1
Louisiana State Univ.	- 3	Washington State Univ.	- 4
Lowell, University of	- 2	Wisconsin, University of	- 2
Massachusetts Inst. of Tech.	- 1	Wright State University	- 7
Meharry Medical College	- 8	Wyoming, University of	- 1
Miami University	- 1	Yale University	- 1
Michigan, University of	- 2		

Total 100

Program Statistics
Continued

6. States Represented - 32

Alabama	- 2
Arizona	- 1
California	- 1
Colorado	- 3
Connecticut	- 1
District of Columbia	- 1
Florida	- 7
Georgia	- 2
Illinois	- 2
Indiana	- 1
Iowa	- 1
Kentucky	- 3
Louisiana	- 6
Maryland	- 3
Massachusetts	- 2
Michigan	- 2
Mississippi	- 2
Montana	- 1
New Jersey	- 1
New Mexico	- 4
New York	- 3
North Carolina	- 3
Ohio	- 17
Oklahoma	- 2
Pennsylvania	- 4
Rhode Island	- 1
South Carolina	- 1
Tennessee	- 10
Texas	- 6
Washington	- 4
Wisconsin	- 2
Wyoming	- 1

7. Age of Participants -

Average - 25.9

APPENDIX 11 B

LIST OF PARTICIPANTS

LIST OF 1986 GRADUATE STUDENT PARTICIPANTS

NAME/ADDRESS	DEGREE, SPECIALTY, LABORATORY ASSIGNED
Susan M. Abrams University of Illinois Dept. of Bioengineering Chicago, IL 60680 (312) 996-8661	<u>Degree:</u> B.S., Human Factors Engineering, 1984 <u>Specialty:</u> Zoology <u>Assigned:</u> HRL/OT
William H. Acton University of New Mexico Dept. of Psychology Albuquerque, NM 87131 (505) 277-4121	<u>Degree:</u> M.A., Applied Behavioral Science, 1984 <u>Specialty:</u> Psychology <u>Assigned:</u> AAMRL
Julie A. Albertson Washington State University Dept. of Mechanical Engineering Pullman, WA 99164-2920 (509) 335-8654	<u>Degree:</u> B.S., Mechanical Engineering, 1985 <u>Specialty:</u> Mechanical Engineering <u>Assigned:</u> FJSRL
Jay H. Ambrose University of Kentucky Dept. of Mechanical Engineering Lexington, KY 40506 (606) 257-2663	<u>Degree:</u> M.S., Mechanical Engineering, 1985 <u>Specialty:</u> Mechanical Engineering <u>Assigned:</u> APL
Mark R. Anderson Purdue University School of Aeronautics and Astronautics Grissom Hall W. Lafayette, IN 47907 (317) 494-5154	<u>Degree:</u> M.S., Engineering, Aeronautics and Astro- nautics, 1984 <u>Specialty:</u> Engr. Aeronautics and Astronautics <u>Assigned:</u> FDL
Stanley F. Anton Rutgers-The State University of New Jersey Psychology Department Psychology Bldg. Busch Campus New Brunswick, NJ 08903 (201) 932-4036	<u>Degree:</u> M.S., Cognitive Psychology, 1986 <u>Specialty:</u> Cognitive Psychology <u>Assigned:</u> AAMRL

Christopher P. Antworth
Florida State University
Department of Chemistry
Box 13
Tallahassee, FL 32306
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Degree: B.S., Chemistry, 1980
Specialty: Chemistry
Assigned: ESC

Sherif A. Aziz
Wright State University
Systems Engineering
School of Engineering
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Dayton, OH 45435
(513) 873-2403

Degree: B.S., Systems and
Biomedical Eng., 1984
Specialty: Biomedical Engineering
Assigned: AAMRL

Alan H. Baginski
University of Lowell
Electrical Engineering
Lowell, MA 01854
(617) 452-5000

Degree: B.S., Electrical
Engineering, 1983
Specialty: Electrical Engineering
Assigned: RADC

Joseph M. Boroughs
University of New Mexico
Psychology Department
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Degree: M.A., Psychology, 1981
Specialty: Psychology
Assigned: AAMRL

Dale T. Bracken
University of Georgia
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Specialty: Psychology
Assigned: HRL/10

Angela M. Braun
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Degree: B.A., Biology, 1986
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Assigned: SAM

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Specialty: Engineering
Assigned: ML

Paul E. Bussey
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Degree: B.S., Electrical
Engineering, 1986
Specialty: Electrical Engineering
Assigned: FJSRL

Timothy T. Clark
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Degree: BSME, Fluid Dynamics, 1983
Specialty: Mechanical Engineering
Assigned: WL

Otis Cosby, Jr.
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Specialty: Bioengineering
Assigned: AAMRL

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Degree: B.S., Physics, 1982
Specialty: Physics
Assigned: ML

Michael P. Farr
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Degree: M.S., Polymer Science, 1984
Specialty: Polymer Science
Assigned: ML

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Degree: B.S., Chemistry, 1986
Specialty: Chemistry
Assigned: ML

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Specialty: Chemistry
Assigned: AAMRL

Carl V. Frank
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Degree: B.S., Computer Science,
1985
Specialty: Computer Science
Assigned: SAM

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Assigned: RADG

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Assigned: SAM

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333 W. 10th Avenue
Columbus, OH 43210
(614) 422-1462

Degree: M.S., Exercise
Physiology, 1983
Specialty: Physiology,
Assigned: AAMRL

Ellen S. Goldey
Miami University
Zoology Dept.
210 N. Main #4
Oxford, OH 45056
(513) 529-3451

Degree: B.S., Biology, 1984
Specialty: Biology
Assigned: AAMRL

Alfred W. Gordon
Atlanta University
Dept. of Biology
360 Westview Drive, S.W.
Atlanta, GA 30314
(404) 681-0251

Degree: B.A., Biology, 1976
Specialty: Biology
Assigned: SAM

Nadia C. Greenidge
New York University
Dept. of Anthropology
25 Waverly Place
New York City, NY
(212) 598-3258

Degree: M.S., Physical Anthropology
Specialty: Physical Anthropology
Assigned: AAMRL

Peggy J. Grigsby
Wright State University
Physics Department
Dayton, OH
(513) 873-2950

Degree: M.S., Mathematics, 1978
Specialty: Mathematics
Assigned: ML

Brad L. Halverson
Washington State University
Dept. of Civil and Environmental
Engineering
Sloan Hall 102
Structures Section
Pullman, WA 99164-2914
(509) 335-4921

Degree: B.S., Civil Engineering,
1985
Specialty: Civil Engineering
Assigned: WL

Charles R. Hammond
Vanderbilt University
Dept. of Mechanical and
Materials Engineering
P O Box 1592, Station B
Nashville, TN 37235
(615) 322-0892

Degree: M.S., Mechanical
Engineering, 1983
Specialty: Mechanical Engineering
Assigned: AEDC

Darren E. Hart
Texas A&M University
Dept. of Psychology
College Station, TX 77843
(409) 845-2581

Degree: B.A., Psychology, 1984
Specialty: Psychology
Assigned: HRL/MD

Peter V. Hlinomaz
University of Michigan-Dearborn
4901 Evergreen Road
Dearborn, MI 48128
(313) 593-5420

Degree: B.S., Electrical
Engineering, 1985
Specialty: Electrical Engineering
Assigned: RADC

Stephen Hom
Massachusetts Institute of
Technology
Mechanical Engineering Dept.
77 Massachusetts Avenue
Cambridge, MA 02139
(617) 253-5028

Degree: M.S., Structural
Engineering, 1977
Specialty: Structural Engineering
Assigned: ML

Jamal A. Hussein
University of Toledo
Mechanical Engineering Dept.
2801 W. Bancroft
Toledo, OH 43606
(419) 537-2620

Degree: M.S., Mechanical
Engineering, 1986
Specialty: Mechanical Engineering
Assigned: APL

David W. Jansen
Dept. of Zoology
Washington State University
Pullman, WA 99164-4220
(509) 336-3564

Degree: M.S., Zoology, 1980
Specialty: Zoology
Assigned: AAMRL

Karl K. Klett, Jr.
University of Wyoming
P O Box 3905
University Station
Laramie, WY 82071
(307) 766-6150

Degree: B.S., 1979
Specialty: Astrophysics
Assigned: AFGL

Raymond M. Kolonay
Ohio State University
Dept. of Civil Engineering
2070 Niel Avenue
Hitchcock Hall, Room 470
Columbus, OH 43210
(614) 422-2771

Degree: B.S., Civil Engineering,
1985
Specialty: Civil Engineering
Assigned: FDL

Craig A. Langenfeld
Ohio State University
Mechanical Engineering Dept.
305 Stonemill Road
Dayton, OH 45409
(513) 299-3218

Degree: B.S., Mechanical
Engineering, 1986
Specialty: Mechanical Engineering
Assigned: APL

Tieu-Binh Le
Wright State University
Chemistry Dept.
Dayton, OH 45435
(513) 873-2855

Degree: B.S., Chemistry, 1985
Specialty: Chemistry
Assigned: ML

Mark W. Lisee
University of Lowell
Dept. of Electrical Engineering
Box 2615
North Campus
1 University Avenue
Lowell, MA 01854
(617) 452-5000

Degree: B.S.E.E., expected 1988
Specialty: Electrical Engineering
Assigned: AFGL

Robert K. Littleton
University of Colorado
Physics Department
Austin Bluffs Parkway
Colorado Springs, CO 80903
(303) 593-3000

Degree: B.S., Chemistry, 1975
Specialty: Chemistry
Assigned: FJSRL

George A. Liu
Meharry Medical College
Dept. of Physiology
1005 18th Avenue, North
Nashville, TN
(615) 327-6413

Degree: B.A., Chemistry, 1986
Specialty: Chemistry
Assigned: SAM

Isabel Lopez
Wright State University
Dept. of Chemistry
Dayton, OH 45435
(513) 873-2855

Degree: M.S., Chemistry, 1985
Specialty: Chemistry
Assigned: AAMRL

Michael M. Lukes
Florida State University
Meteorology Dept.
Tallahassee, FL 32306
(904) 644-6205

Degree: B.S., Meteorology, 1973
Specialty: Meteorology
Assigned: ESC

Wayne R. Lundberg
Wright State University
Dept. of Physics and Mechanical
Engineering
3640 Col. Glenn Hiway
Dayton, OH 45435
(513) 873-2954

Degree: B.S., Physics, 1985
Specialty: Physics
Assigned: ML

William A. Marty
University of Oklahoma
Electrical Engineering and
Computer Science
202 West Boyd, Room 219
Norman, OK 73069
(405) 325-4721

Degree: B.S., Electrical
Engineering, 1985
Specialty: Electrical Engineering
Assigned: AL

Mary R. McGill
Eastern Kentucky University
Dept. of Chemistry
1661 Foxhaven #3
Richmond, KY 40475
(606) 624-9772

Degree: B.S., Chemistry, 1985
Specialty: Chemistry
Assigned: ESC

Jennifer McGovern-Weidner
University of Florida
Dept. of Psychology
114 Psychology Bldg.
Gainesville, FL 32611
(904) 392-0605

Degree: M.A., Gifted Education, 1983
Specialty: Psychology
Assigned: SAM

Dara C. Merenski
University of Dayton
Computer Science Dept.
300 College Park Drive
Dayton, OH 45469
(513) 229-2343

Degree: B.S., Systems Analysis, 1986
Specialty: Systems Analyst
Assigned: HRL/LR

Peter D. Meyer
University of Montana
Physics Department
Missoula, MT 59801
(406) 243-6535

Degree: B.A., Chemistry, 1984
Specialty: Chemistry
Assigned: AD

Douglas R. Moore
Univ. of Southern Mississippi
Dept. of Polymer Science
Southern Station Box 10076
Hattiesburg, MS 39406-0076
(601) 266-4868

Degree: B.S., Chemistry, 1977
Specialty: Chemistry
Assigned: ML

Eric V. Morris
Meharry Medical School
1005 18th Street, N.
Nashville, TN 37208
(615) 327-6000

Degree: B.S., Biological Sciences,
1984
Specialty: Pharmacology
Assigned: SAM

Russell Moy
Dept. of Chemical Engineering
The University of Michigan
2135 Dow Building
Ann Arbor, MI 48109-2136
(313) 764-3379

Degree: MSE, Chemical Engineering,
1982
Specialty: Chemical Engineering
Assigned: FJSRL

Glenn D. Munkvold
University of Texas at Austin
Dept. of Chemical Engineering
Austin, TX 78712
(512) 471-1046

Degree: B.S., Chemical Engineering,
1984
Specialty: Chemical Engineering
Assigned: SAM

Conrad R. Murray
Meharry Medical College
1005 D.B. Todd Blvd.
Nashville, TN 37208
(615) 327-6111

Degree: B.S., Pre-Medicine, 1983
Specialty: Medicine
Assigned: SAM

Victoria T. Nasman
Northwestern University
Psychology Department
CRESAP Laboratory
633 Clark Street
Evanston, IL 60201
(312) 492-7643

Degree: B.A., Psychology, 1983
Specialty: Psychology
Assigned: SAM

Sharon E. Navard
Univ. of Southwestern Louisiana
Dept. of Statistics
USL Box 44187
Lafayette, LA 70504
(318) 231-6772

Degree: M.S., Statistics, 1984
Specialty: Statistics
Assigned: AD

Bernadette P. Njoku
Meharry Medical College
School of Medicine
1005 D.B. Todd Blvd.
Nashville, TN 37208
(615) 327-4098

Degree: B.A., Chemistry, 1982
Specialty: Chemistry
Assigned: SAM

David P. Norton
Louisiana State University
Dept. of Electrical and
Computer Engineering
Baton Rouge, LA 70803
(504) 388-5488

Degree: M.S., Electrical
Engineering, 1986
Specialty: Electrical Engineering
Assigned: RADC

Roland L. Palmer
The University of Alabama-
Tuscaloosa
Psychology Department
Box 2968
University, AL 35486
(205) 348-5083

Degree: M.A., Psychology, 1985
Specialty: Psychology
Assigned: HRL/MO

Daniel S. Park
Univ. of Southern California
Aerospace Engineering
University Park
Los Angeles, CA 90089-0126
(213) 743-7177

Degree: MSAE, Aerospace
Engineering, 1985
Specialty: Aerospace Engineering
Assigned: FDL

April G. Parker
The Ohio State University
Dept. of Ceramic Engineering
177 Watts 2041 College Road
Columbus, OH 43202
(614) 422-2960

Degree: B.S., Ceramic
Engineering, 1985
Specialty: Ceramic Engineering
Assigned: ML

Deborah L. Parker
Tulane University
Psychology Department
2007 Percival Stern Hall
New Orleans, LA 70118
(504) 865-5331

Degree: M.A., Experimental
Psychology, 1985
Specialty: Psychology
Assigned: HRL/LR

Werner K. Perry
University of Florida
Computer and Info. Sciences
3117 S.W. 29 Avenue
Gainesville, FL 33312
(904) 374-8971

Degree: B.S., BEG-CIS, 1986
Specialty: Engineering
Assigned: AD

Frank M. Pitman
Clemson University
Mechanical Engineering Dept.
Clemson, SC 29631
(803) 654-5140

Degree: B.S., Mechanical
Engineering, 1985
Specialty: Mechanical Engineering
Assigned: FDL

Amy B. Powell
Texas A&M University
Psychology Department
College Station, TX 77843
(409) 845-0377

Degree: B.S., Psychology, 1984
Specialty: Psychology
Assigned: HRL/MD

Surya Raghu
Yale University
Dept. of Mechanical Engineering
Mason Laboratories
Box 2159
New Haven, CT 06520
(203) 436-8676

Degree: M.S., Engineering, 1980
M.S., M. Philosophy, 1986
Specialty: Aeronautical Engineering
Assigned: APL

Mark L. Ratcliff
University of Tennessee
Space Institute
Dept. of Mathematics
U.T.S.I. Upper E
Tullahoma, TN 37388
(615) 455-0631

Degree: B.A., Math, 1984
Specialty: Mathematics
Assigned: AEDC

Christopher Reed
University of Florida
Dept. of Engineering Sciences
Gainesville, FL 32611
(904) 392-0961

Degree: M.S., Engineering Science,
1984
Specialty: Aerodynamics
Assigned: AD

Gregg A. Reger
Univ. of Texas - San Antonio
Life Sciences Dept.
6900 Loop 1604 W.
San Antonio, TX 78285
(512) 691-4458

Degree: B.S., Dietics, 1981
Specialty: Dietics
Assigned: SAM

Anthony E. Restaino
State University of New York-
at Albany
Dept. of Atmospheric Science
1400 Washington Avenue
Albany, NY 12222
(518) 457-3987

Degree: B.S., Meteorology, 1984
Specialty: Meteorology
Assigned: AFGL

Dennis W. Richardson
Pennsylvania State University
Dept. of Electrical Engineering
322 Atherton Hall
University Park, PA 16802
(814) 862-7595

Degree: B.S., Electrical
Engineering, 1983
Specialty: Electrical Engineering
Assigned: AL

Kyle W. Ross
University of New Mexico
Dept. of Mechanical Engineering
Albuquerque, NM 87131
(505) 277-2761

Degree: B.S., Mechanical
Engineering, 1982
Specialty: Mechanical Engineering

Susan E. Sadofsky
Boston Universtiy
Math Department
111 Cummington Street
Boston, MA 02215
(617) 353-2560

Degree: M.A., Mathematics, 1986
Specialty: Mathematics
Assigned: AFGL

Yolman J. Salinas
Meharry Medical College
School of Medicine
1005 Dr. D.B. Todd Blvd.
Nashville, TN 37208
(615) 327-6308

Degree: M.S., Biochemistry, 1984
Specialty: Biochemistry
Assigned: SAM

William D. Schmidt
Indiana Univ. of Pennsylvania
Physics Department
Indiana, PA 15705
(412) 357-2100

Degree: B.S., Physics, 1983
Specialty: Physics
Assigned: AL

James P. Seaba
The University of Iowa
Mechanical Engineering Dept.
2228 Engineering Bldg.
Iowa City, IA 52242
(319) 353-6045

Degree: B.S., Mechanical
Engineering, 1984
Specialty: Mechanical Engineering
Assigned: APL

Laura Sewall
Brown University
Psychology Department
Box 1853
Providence, RI 02912
(401) 863-2727

Degree: B.S., Psychology, 1985
Specialty: Psychology
Assigned: HRL/OT

Loren T. Simpson
Davidson College
Mathematics Department
P O Box 2964
Davidson, NC 28036
(704) 892-8226

Degree: B.S., Mathematics, 1986
Specialty: Mathematics
Assigned: AFGL

Jim S. Sirkis
University of Florida
Dept. of Engineering Sciences
321 Aerospace Building
Gainesville, FL 32611
(904) 392-0961

Degree: M.S., Engineering
Mechanics, 1985
Specialty: Engineering Mechanics
Assigned: AD

Michael J. Slifker
Cornell University
Dept. of Computer Science
304 Kimball
Ithaca, NY 14850
(607) 255-5577

Degree: B.S., Computer Science, 1985
Specialty: Computer Science
Assigned: WL

Barry J. Stagg
Louisiana State University
Mechanical Engineering Dept.
Baton Rouge, LA 70803-6413
(504) 388-5792

Degree: B.S., Mechanical
Engineering, 1986
Specialty: Mechanical Engineering
Assigned: RPL

Martin A.P. Strnat
University of Dayton
Dept. of Biology
300 College Park Drive
Dayton, OH 45469
(513) 229-2135

Degree: B.S., Biology, 1984
Specialty: Biology
Assigned: AAMRL

John E. Swift
University of Oklahoma
School of Electrical Eng. and
Computer Science
202 West Boyd
Norman, OK 73069
(405) 325-4721

Degree: B.S., Electrical
Engineering, 1986
Specialty: Electrical Engineering
Assigned: AL

Moussa P. Tamer
Meharry Medical College
School of Medicine
1005 18th St.
Nashville, TN 37208
(615) 356-8756

Degree: B.S., Chemistry, 1983
Specialty: Chemistry
Assigned: SAM

Donald E. Tilton
University of Kentucky
Dept. of Mechanical Engineering
Lexington, KY 40506
(606) 257-2662

Degree: B.S., Mechanical
Engineering, 1985
Specialty: Mechanical Engineering
Assigned: APL

Shun P. Tschen
University of Iowa
Mechanical Engineering Dept.
Iowa City, IA 52242
(319) 353-5638

Degree: B.S., Mechanical
Engineering, 1985
Specialty: Mechanical Engineering
Assigned: APL

Cheryl A. Ulmer
Wright State University
Dayton, OH 45435
(513) 873-2210

Degree: B.S., Psychology, 1980
Specialty: Psychology
Assigned: HRL/LR

Joseph C. Varga
Kent State University
Dept. of Physics
Kent, OH 44242
(216) 672-2246

Degree: M.S., Physics, 1978
Specialty: Physics
Assigned: ML

Gregory L. Walker
University of Wisconsin-Madison
Engineering Mechanics Dept.
Engineering Building
1415 Johnson Drive
Madison, WI 53706
(608) 262-3990

Degree: B.S., Engineering
Mechanics, 1985
Specialty: Engineering Mechanics
Assigned: RPL

Mark M. Weislogel
Washington State University
Dept. of Mechanical Engineering
Pullman, WA 99164-2920
(509) 335-2727

Degree: B.S., Mechanical
Engineering, 1986
Specialty: Mechanical Engineering
Assigned: APL

Steven P. Wicelinski
Louisiana State University
Dept. of Chemistry
LSU Box 22023
Baton Rouge, LA 70893
(504) 388-5811

Degree: B.S., Chemistry, 1981
Specialty: Chemistry
Assigned: FJSRL

Celeste B. Williams
Auburn University
Dept. of Electrical Engineering
Broun Hall
Auburn, AL 36830
(205) 887-1843

Degree: B.S., Physics, 1984
Specialty: Physics
Assigned: RADC

Cornell L. Wooten
Texas Southern University
Math Department
3201 Wheeler
Houston, TX 77004
(713) 527-7011

Degree: B.S., Math and Mechanical
Engineering, 1985
Specialty: Mathematics
Assigned: AFGL

John S. Wroblewski
Univ. Southwestern Louisiana
Chemistry Department
P O Box 44370
Lafayette, LA 70504
(318) 231-6734

Degree: B.S., Chemistry, 1984
Specialty: Chemistry
Assigned: RPL

Jon D. Zobel, Jr.
University of Colorado at
Colorado Springs
Dept. of Electrical Engineering
Austin Bluffs Parkway
Colorado Springs, CO 80907
(303) 593-3351

Degree: B.S., Electrical
Engineering, 1986
Specialty: Electrical Engineering
Assigned: FJSRL

APPENDIX II C

PARTICIPANT LABORATORY ASSIGNMENT

C. PARTICIPANT LABORATORY ASSIGNMENT (Page 1)

1986 USAF/UES GRADUATE STUDENT SUMMER SUPPORT PROGRAM

AERO PROPULSION LABORATORY (AFWAL/APL)
(Wright-Patterson Air Force Base)

- | | |
|-----------------------------|-------------------------|
| 1. Jay H. Ambrose | 5. James Phillip Seaba |
| 2. Jamal Ali Hussein | 6. Donald E. Tilton |
| 3. Craig Anthony Langenfeld | 7. Shun Peter Tschen |
| 4. Surya Raghu | 8. Mark Milton Weisloge |

ARMAMENT LABORATORY (AD)
(Eglin Air Force Base)

- | | |
|----------------------------|------------------------------|
| 1. Jennifer Lee Davidson | 4. Christopher William Perry |
| 2. Peter David Meyer | 5. Christopher William Reed |
| 3. Sharon Elizabeth Navard | 6. James Sanford Sirkis |

ARMSTRONG AEROSPACE MEDICAL RESEARCH LABORATORY (AAMRL)
(Wright-Patterson Air Force Base)

- | | |
|-----------------------------|--------------------------|
| 1. William Howard Acton | 8. Beverly Elaine Girten |
| 2. Stanley Francis Anton | 9. Ellen Sue Goldey |
| 3. Sherif Adel Aziz | 10. Nadia C. Greenidge |
| 4. Joseph Marshall Boroughs | 11. David W. Jansen |
| 5. Brian John Doherty | 12. Isabel Lopez |
| 6. Michelle Joanne Ferry | 13. Martin A.P. Strnat |
| 7. Beverley Ann Gable | |

ARNOLD ENGINEERING DEVELOPMENT CENTER (AEDC)
(Arnold Air Force Station)

1. Charles Reif Hammond
2. Mark Lindsay Ratcliff

AVIONICS LABORATORY (AFWAL/AL)
(Wright-Patterson Air Force Base)

- | | |
|------------------------------|--------------------------|
| 1. William Albert Marty | 3. William David Schmidt |
| 2. Dennis William Richardson | 4. John Edward Swift |

ENGINEERING SERVICE CENTER (ESC)
(Tyndall Air Force Base)

1. Christopher Paul Antworth
2. Michael Miles Lukes
3. Mary Ruth McGill

C. PARTICIPANT LABORATORY ASSIGNMENT (Page 2)

FLIGHT DYNAMICS LABORATORY (AFWAL/FDL)
(Wright-Patterson Air Force Base)

- | | |
|----------------------------|----------------------|
| 1. Mark Ronald Anderson | 4. Frank Mark Pitman |
| 2. Raymond Michael Kolonay | 5. Kyle W. Ross |
| 3. Daniel Suwhan Park | |

FRANK J. SEILER RESEARCH LABORATORY (FJSRL)
(USAF Academy)

- | | |
|------------------------|---------------------------|
| 1. Julie Ann Albertson | 4. Russell Moy |
| 2. Paul Eugene Bussey | 5. Steven Paul Wicelinski |
| 3. Robert K. Littleton | 6. Jon D. Zobel, Jr. |

GEOPHYSICS LABORATORY (AFGL)
(Hanscom Air Force Base)

- | | |
|----------------------------|-----------------------------|
| 1. Karl Kennedy Klett, Jr. | 4. Susan Ellen-Ann Sadofsky |
| 2. Mark Welton Lisee | 5. Loren Taylor Simpson |
| 3. Anthony Edward Restaino | 6. Cornell Leroy Wooten |

HUMAN RESOURCES LABORATORY/ID (HRL/ID)
(Lowry Air Force Base)

1. Dale Thomas Bracken

HUMAN RESOURCES LABORATORY/LR (HRL/LR)
(Wright-Patterson Air Force Base)

1. Dora C. Merenski
2. Deborah Lynn Parker
3. Cheryl Ann Ulmer

HUMAN RESOURCES LABORATORY/MO (HRL/MO)
(Brooks Air Force Base)

1. Daren Edward Hart
2. Roland Lavelle Palmer
3. Amy Beth Powell

HUMAN RESOURCES LABORATORY/OT (HRL/OT)
(Williams Air Force Base)

1. Susan Marci Abrams
2. Laura Sewall

MATERIALS LABORATORY (AFWAL/ML)
(Wright-Patterson Air Force Base)

- | | |
|----------------------------|----------------------------|
| 1. David Allen Bridenstine | 7. Tieu-Binh Le |
| 2. Franklin John Dunmore | 8. Wayne Randolph Lundberg |
| 3. Michael Patrick Farr | 9. Douglas Roger Moore |
| 4. Christopher Adam Field | 10. April Gayle Parker |
| 5. Peggy Jo Grigsby | 11. Joseph Charles Varga |
| 6. Stephen Hom | |

C. PARTICIPANT LABORATORY ASSIGNMENT (Page 3)

ROCKET PROPULSION LABORATORY (RPL)

(Edwards Air Force Base)

1. Douglas Wayne DeHart
2. Barry James Stagg

3. Gregory Lane Walker
4. John Stephen Wroblewski

ROME AIR DEVELOPMENT CENTER (RADC)

(Griffiss Air Force Base)

1. Alan Henry Baginski
2. Michael Dean Garner
3. Peter Vladimír Hlinomaz

4. David Paul Morton
5. Celeste Benay Williams

SCHOOL OF AEROSPACE MEDICINE (SAM)

(Brooks Air Force Base)

1. Angela Marie Braun
2. Otis Cosby, Jr.
3. Carl Von Frank
4. Maurice B. Gilbert
5. Alfred Wendell Gordon
6. George Albert Liu
7. Jennifer McGovern Weidner
8. Eric Van Morris

9. Glenn D. Munkvold
10. Conrad Robert Murray
11. Victoria Nasman
12. Bernadette Patricia Njoku
13. Gregg Allen Reger
14. Yolman John Salinas
15. Moussa Pierre Tamer

WEAPONS LABORATORY (WL)

(Kirtland Air Force Base)

1. Timothy Truman Clark
2. Bradley Halverson
3. Michael Jude Slifker

APPENDIX III

- A. Listing of Research Reports Submitted in the
1986 Graduate Student Summer Support Program
- B. Abstracts of the 1986 Summer Fellow's
Research Reports

RESEARCH REPORTS

1986 GRADUATE STUDENT SUMMER SUPPORT PROGRAM

<u>Technical Report Number</u>	<u>Title</u>	<u>Graduate Researcher</u>
Volume I		
1	The Effects of Fourier Limited Targets Upon Peripheral Perception	Susan M. Abrams
2	Studies of the Dimensionality of Subjective Workload and Standard Loading Levels in a Continuous Recall Task	William H. Acton
3	An Investigation of Unsteady Vorticity Production by a Pitching Airfoil	Julie A. Albertson
4	An Apparatus for Transient Saturation Measurements in a Heat Pipe	Jay H. Ambrose
5	Flight Control Synthesis with Practical Design Constraints	Mark R. Anderson
6	The Effects of Flow Rate and Edge Rate on the Perception of Self Speed	Stanley F. Anton
7	A Dispersion-Corrected HPLC/FACP Method for Measuring Sorption Isotherms of Substituted Aromatics on Soil Organic Matter	Christopher P. Antworth
8	Computer Simulation of the Cardio-vascular System Under +G _z Stress	Sherif A. Aziz
9	Inefficiencies of High Transmission Delays on Computer Protocols and their Applications	Alan H. Baginski
10	Cognitive Resources and Multi-Task Cost	Joseph M. Boroughs
11	Job/Task Difficulty and Job/Task Experience: A Literature Review	Dale T. Bracken, Jr.
12	Chlamydomonas Phototaxis as a Simple System for Testing the Effect of Drugs on Vision	Angela M. Braun
13	Research for the Development of an Executive System Prototype for Unified Life Cycle Engineering	David A. Bridenstine

- | | | |
|----|--|----------------------|
| 14 | Development of a High Speed Infrared Detection and Recording System with Resident Image Processing and Graphic Data Display for Support of Remote Defense Nuclear Agency High-Powered Pulsed Microwave Source Measurements | Paul E. Bussey |
| 15 | Modification of a Finite-Difference, 2-Dimensional Boundary Layer Code for Application to the Free Shear Layer of an Axisymmetric Jet | Timothy T. Clark |
| 16 | Mesopic Visual Function in Aircrew | Otis Cosby, Jr. |
| 17 | A Mathematical Classification of a Family of Edge Detectors | Jennifer L. Davidson |
| 18 | Design and Analysis of Models of Large Space Structures | Douglas W. DeHart |
| 19 | A Biomechanical Study of Anthropomorphic Head-Neck Systems | Brian J. Doherty |
| 20 | Materials Evaluation and Failure Analysis of Various Electronic Circuitry Components of Air Force Aircraft | Franklin J. Dunmore |
| 21 | Thermal Characterization of New Thermally Stable Matrix Materials | Michael P. Farr |
| 22 | Synthesis of Intermediates and Monomer of Polybenzothiazole | Christopher Feild |
| 23 | The Metabolism of t-Butylcyclohexane in Male Fischer 344 Rats | Michelle J. Ferry |
| 24 | Data Management Within the School of Aerospace Medicine | Carl V. Frank |
| 25 | The Effects of High Noise Levels and Obstruction to Articulation on the Acoustic-Phonetic Structure of Speech: A Preliminary Investigation | Beverley A. Gable |
| 26 | A Study of the Probability Distributions of the Long Term Variations of Acoustical Noise Over Time of Various Military Environments | Michael D. Garner |
| 27 | Exposure of Polycarbonate Lens to Natural Elements | Maurice B. Gilbert |

28	Effects of Dobutamine Administration on Suspension Hypokinesia/Hypodynamia Deconditioning in Rats	Beverly Girten
29	Experimental Evidence Supporting a Pharmacokinetic Model of Uptake and Metabolism of Trichloroethylene in the Pregnant and Lactating Rat	Ellen S. Goldey
30	Effects of Acceleration Stress Upon Blood Lipid Levels	Alfred W. Gordon
31	Microfracture Patterns in the Lumbar Vertebrae of Macaca mulatta	Nadia C. Greenidge
32	Effects of Coherent Scattering on IR Absorption in Doped Semiconductors	Peggy J. Grigsby
33	A Modification of the ACSYS Preprocessor Code for use with the SAMSON2 Finite - Element Program	Brad L. Halverson
34	Automation of the Method of Optimal Design	Charles R. Hammond
35	Empirical Confidence Intervals for a Validity Coefficient Under Range Restriction: An Application of the Bootstrap	Daren E. Hart
36	An Analysis of Residual Output Noise from the R.A.D.C. Speech Enhancement Unit	Peter V. Hlinomaz
37	Knowledge for the ULCE Expert System	Stephen Hom
38	An Analytical Investigation for Designing an Energy Storage Container for Storing Lithium Hydride Between 300K and 1200K	Jamal A. Hussein
39	Modeling of Human Body Movement	David W. Jansen
40	Noise Analysis and Reduction for the AFGL Infrared Focal Plane Array Spectrometer	Karl K. Klett, Jr.
41	Structural Optimization Using Bending Elements	Raymond Kolonay
42	Swirling Flows in Dump Combustors	Craig A. Langenfeld

43	Thermal Stability Studies of Structure-Property Relationship of Various Silahydrocarbon Lubricants	Tieu-Binh Le
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APPENDIX III B

ABSTRACTS

THE EFFECTS OF FOURIER LIMITED TARGETS UPON PERIPHERAL PERCEPTION

by

Susan Abrams Baroff

ABSTRACT

The effects of varying the bandwidth of a two dimensional line figure, through its Fourier transform, was studied. It was found that by varying the presentation time (30, 95 and 300 ms.) and the angle of presentation of stimuli (0.75, 10, and 20 degrees), that discrimination between two harmonically related figures could be altered. Three equal area targets of increasing complexity were used as stimuli. Three subjects were tested under 27 different conditions, which involved rating the similarity of two harmonically related figures. Preliminary analysis indicates that there is an interaction between presentation time and eccentricity; there is also evidence that discrimination is poorer for simple targets than for more complex targets. Further analysis has yet to be completed.

Studies of the Dimensionality of Subjective Workload and
Standard Loading Levels in a Continuous Recall Task

by

William H. Acton

ABSTRACT

Data from a study which employed Multidimensional Scaling techniques to suggest optimal workload rating scales were analyzed. The results indicated that two types of task characteristics were related to judgements of task similarity: overall task difficulty and requirements for central vs perceptual/motor processing. These conclusions were based on the multidimensional scaling results and on analyses in which univariate ratings were regressed onto the scaling results. In other research, parametric evaluation of the CTS Continuous Recall task showed that both task performance and subjective ratings of mental workload were significantly different for three levels of task difficulty produced by combinations of item complexity and number of items to be held in memory.

An Investigation of Unsteady Vorticity Production by a Pitching Airfoil

by

T.R. Troutt
J.A. Albertson

Abstract

This research investigation concentrated on developing insight into the unsteady aerodynamics produced by pitching airfoils in uniform airstreams. The specific experimental situation addressed involved a two-dimensional NACA 0015 airfoil which was pitched at constant rates through angles of attack from 0-60 degrees. The experimental results analyzed included high speed motion picture flow visualizations and simultaneous pressure measurement from eighteen chord locations distributed over the surface of the airfoil. The research techniques employed involved both the development of simple analytical procedures for computation of the vorticity generation rates by the surface of the pitching airfoil and digital image techniques for enhancing and quantifying interpretations of the visualization results. The analytical results demonstrate that the nondimensional parameter $\alpha^+ = \dot{\alpha}c/U$, where $\dot{\alpha}$ is the airfoil pitching rate, c is the airfoil chord length, and U is the free stream velocity, should be the primary parameter for predicting the relative influence of pitching rate and free stream velocity on the unsteady aerodynamics around an airfoil. This result agrees closely with experimental findings. The results from the image analysis techniques show that the initiation of the dynamic stall vortex on the airfoil top surface corresponds closely to a halt in the increase in lift as a function of attack angle curve. The subsequent fast growth of the dynamic stall vortex is found to accompany a rapid decrease in the lift on the airfoil.

An Apparatus for Transient Saturation Measurements in a Heat Pipe

by

J. H. Ambrose

ABSTRACT

This report describes the design and fabrication of an apparatus which will be used to obtain direct measurements of the liquid distribution in a heat pipe wick during transient and steady state operation. Attenuation of x-rays by the liquid in the wick will be utilized for measuring the saturation as a function of time and position.

Saturation measurements have been made in heat pipes in the past using radiography. However, all cases of detailed measurements were limited to the case of steady state operation. Real time neutron imaging systems are still under development and these present the most promise for imaging of liquids through metals. X-ray radiography is usually not very useful because the metals attenuate x-rays strongly while liquids attenuate x-rays very weakly.

To facilitate accurate saturation measurements using x-ray radiography, a special heat pipe was designed with beryllium walls which are relatively transparent to x-rays. Thus, the attenuation of the wall material has been kept very low, enabling the use of very low energy x-rays. A synthetic fabric is used as the wicking material and it too is fairly transparent. The liquid attenuates x-rays strongly enough to be seen through the wall and wick material. Transient measurements will be accomplished by taking rapid exposures of the apparatus at short time intervals, and determining the saturation distribution with a recording microphotodensitometer.

FLIGHT CONTROL SYNTHESIS
WITH PRACTICAL DESIGN CONSTRAINTS

by

Mark R. Anderson

ABSTRACT

Of the many requirements a flight control system must meet, the most important issues relevant to preliminary design are: closed-loop performance, stability robustness, and control law complexity. For the flight control problem, closed-loop performance is defined by how well the augmented vehicle dynamics meets given airworthiness specifications. However, these specifications must be met within the constraints imposed by the control surface actuation hardware. The apparent design trade-off between meeting flying qualities specifications within actuation constraints is discussed.

The Effects of Flow Rate and Edge
Rate on the Perception of Self Speed

by

Stanley Anton

ABSTRACT

An experimental design was developed to determine the individual effects of flow rate and edge rate on the perception of egospeed. Flow rate and edge rate, normally linked in the environment, were tested separately by holding one constant while varying the other. A computer generated flow field consisting of earth tone textured blocks was devised which could independently cause the flow rate and the edge rate to accelerate or decelerate. Subjects were instructed to pedal on an exercise bicycle at the same rate as the moving flow field. Preliminary results suggest that the dominant effect on the perception of egospeed is flow rate, at least for viewing durations of 30 seconds. One recommendation is to have the subject actively control the rates of change of the flow field by his own motion.

A DISPERSION-CORRECTED HPLC/FACP METHOD FOR MEASURING SORPTION
ISOTHERMS OF SUBSTITUTED AROMATICS ON SOIL ORGANIC MATTER

by

Chris Antworth

ABSTRACT

A High Performance Liquid Chromatography (HPLC) method was developed in order to study the sorption of substituted aromatics on various fractions of soil organic matter (SOM). Isotherms were calculated from the desorption branch of a single breakthrough curve via the Frontal Analysis by Characteristic Point (FACP) technique. Using nonretained solutes, a dispersion correction was incorporated into the calculations and the resulting dispersion-corrected HPLC/FACP method was shown to produce isotherms similar to those generated by the conventional Frontal Analysis (FA) method. The FACP technique, however, greatly reduces analysis times.

Sorption isotherms of a number of substituted aromatic compounds, each representing a different type of specific solute polarity, were determined on several SOM fractions. The resulting K_d values indicate that each SOM fraction possesses a unique set of active sites. These results imply that the sorption of relatively polar organic compounds cannot be adequately explained by the hydrophobic model, and suggest a series of experiments to determine at what level of solute water solubility the hydrophobic model needs revision.

Computer Simulation of the Cardiovascular System Under +G_z Stress

by

Sherif A. Aziz

ABSTRACT

A state-variable model of the cardiovascular system under +G_z stress was implemented. The model (which includes simulation of the arterial and venous systems, heart, baroreceptor control of the heart and venous tone, and inputs for acceleration force and externally applied pressure) was used to study the impairment of cerebral function during +G_z stress. It was found that even though eye level blood pressure decreases significantly during G_z stress, cerebral blood flow is maintained due to a compensatory mechanism which compares favorable with the experimental results found in the literature. This model will be used to investigate the effectiveness of anti-G suits. Finally, a preliminary design of a closed-loop control system for an anti-G suit was carried out. It was found that it is possible to control both the rise time (which is needed for the improvement of G-valve) and the overshoot of the suit pressure. More work needs to be done both in the simulation and design areas.

Inefficiencies of High Transmission Delays on
Computer Protocols and their Applications

by

Alan H. Baginski

ABSTRACT

The performance of the Transmission Control Protocol (TCP) was studied in order to find inefficiencies in a high transmission delay environment. It was determined that improvements to the TCP could be made in the connection set up procedure, the window size assignment algorithm, and the handling of transmission errors so that the delays may be minimized. The performance of a process synchronization application using a communication protocol such as the TCP was also studied for inefficiencies in the context of a high delay environment. A hierarchical mutual exclusion algorithm was proposed. The benefits that these results could bring to the performance of the Cronus distributed operating system is discussed.

COGNITIVE RESOURCES AND MULTI-TASK COST

by

Joseph M. Boroughs

ABSTRACT

The construct of cognitive resources is reviewed with special emphasis on the need to develop design principles and guidelines for reducing multi-task cost. Although the concept of cognitive resources has been widely accepted by cognitive psychologists it does not represent the only manner in which multi-task interference can be viewed. The number of alternative views is numerous, however, and no relevant alternative theories have been developed. It is recommended that the Air Force initiate a program of basic research which aims to identify those aspects of tasks which are the greatest causes of multi-task cost.

Job/Task Difficulty and Job/Task Experience:

A Literature Review

by

Dale Bracken Jr.

ABSTRACT

Industrial/organizational as well as human factors literature conceptualizes job/task difficulty and job/task experience through a variety of definitions. It is necessary to organize the various definitions of job/task difficulty and job/task experience in order to better understand their impact on a study. This review examines the various concepts of job/task difficulty and job/task experience as literature has related them to measures of job/task performance. Job/task difficulty definitions were collapsed and categorized into a conceptual scheme of organization. Job/task difficulty measures were classsified along two dimensions: Definitional referent which refers to whether job/task difficulty is defined in terms of characteristics intrinsic to the task or the performer; and measurement objectivity/subjectivity which is concerned with the extent of human judgment involved in the measurement of difficulty. Job/task difficulty as well as job/task experience literature finds the particular variables to affect performance in a variety of ways. Future research on difficulty and experience must employ psychometrically sound measures to examine the relation between difficulty, experience, and performance.

CHLAMYDOMONAS PHOTOTAXIS AS A SIMPLE SYSTEM FOR
TESTING THE EFFECT OF DRUGS ON VISION

by

Angela M. Braun

ABSTRACT

The major goal of this program is to develop, refine, and characterize the phototaxis system in Chlamydomonas reinhardtii and then employ it in the goal of finding and quantifying the effect of drugs which may enhance dark or color vision in pilots. A major problem associated with the testing of drugs which may affect vision in animals or man is that the drugs may affect more than one tissue, organ, or organ system. The advantage of first testing the effect of the drugs on the ability of a phototactic alga such as Chlamydomonas to swim toward the light is the inherent simplicity of the system in which the investigator can control the variables. Chlamydomonas is a simple, single-celled alga whose phototaxis apparatus biochemically mimics the fundamental vision system of man.

Major emphasis of our research team, Ms. Angela Braun, Dr. Taboada and Dr. Moyer has been the simplification of the procedure for producing phototactic cells and improve the method for measuring phototaxis. Eight Strains of Chlamydomonas reinhardtii were placed under phototaxis-inducing conditions and the growth and phototactic ability of the strains compared in different phases of their growth curves. Various means of measuring phototaxis were investigated. We were successful in simplifying and shortening the procedure for developing phototactic cells and in developing a simple and rapid method for quantifying the phototactic ability of algal cells to any wavelength of light between 400 and 700 nanometers.

Because of the large amount of data generated and the size limitation of the final report, the final reports of Ms. Braun and Dr. Moyer have been cooperatively blended to provide enough space to include all of the figures and legends.

Research for the Development of an Executive System
Prototype for Unified Life Cycle Engineering

by

David Bridenstine

ABSTRACT

It is generally acknowledged that it is desirable to include manufacturability criteria early in the product life cycle. This concept is one driving force in the integration of CAD/CAM. It is logical to extend this notion to that of considering all aspects of engineering simultaneously from the onset. This paper identifies key issues in the development of a system capable of integrating knowledge from all aspects of the life cycle throughout the engineering process. The fundamental component of a system that does this engineering in parallel is the control module containing meta-level knowledge. The module is referred to as the Executive System. Research issues in the development of an Executive System are discussed. This paper then proposes and describes a prototype system that could be developed for continuing research. The development of this prototype would involve research in fundamental issues of a general system. The prototype is a materials and process selector for a well defined class of geometric shapes.

Development of a High Speed Infrared Detection and Recording
System with Resident Image Processing and Graphic Data
Display for Support of Remote Defense Nuclear Agency
High-Powered Pulsed Microwave Source Measurements

by

Paul E. Bussey

ABSTRACT

Infrared detection and measurement of electromagnetic field strengths is used at the University of Colorado at Colorado Springs (UCCS). In each experiment, the measurements are of steady-state, continuous wave (CW) conditions. However, Seiler Labs was asked to support the test of a pulsed microwave source to be conducted by the Defense Nuclear Agency (DNA) at the Air Force Weapons Laboratory (AFWL) in late July or early August, 1986; the AGA Thermovision 780 system that is used by UCCS is not suited for such tests. Subsequent investigation revealed that an appropriate and affordable system could not be obtained for the test. At that point, a means of adapting the present system at UCCS to support the test was pursued. The resulting system consists of the AGA system, and a modified IBM PC/AT to store the data and do all of the necessary data/image processing at the remote test site. The effort was a three phase group effort, including hardware development, software development, and detection material

MODIFICATION OF A FINITE-DIFFERENCE, 2-DIMENSIONAL
BOUNDARY LAYER CODE FOR APPLICATION TO THE
FREE SHEAR LAYER OF AN AXISYMMETRIC JET

by

Timothy T. Clark

ABSTRACT

An existing finite-difference, 2-dimensional boundary layer code was modified so that it could be applied to the free shear layer of an axisymmetric jet. The governing equations and boundary conditions of the free shear layers of the jet were derived. These equations were non-dimensionalized and scale factors were found. The non-dimensionalized equations were expressed in stream-function form and the result was expressed as finite-difference equations. The derived finite-difference equations and the boundary conditions formed the basis of modifications to the code. The code was exercised and the results compared to similarity solutions. The comparisons indicated that the code yielded reasonable results.

MESOPIC VISUAL FUNCTION IN AIRCREW

by

Otis Cosby, Jr.

ABSTRACT

Mesopic vision may prove to be a more important component of the visual system during USAF night missions than scotopic vision. Ninety aircrew members were tested using the Nyktometer (mesopic vision tester) under mesopic conditions, both with and without glare. The subjects were placed into one of three age categories: 1) Less than 29, 2) 30-39, 3) 40 and above. There appeared to be a weak correlation between age and Nyktometer performance.

A MATHEMATICAL CLASSIFICATION OF A FAMILY OF EDGE DETECTORS

Jennifer L. Davidson

ABSTRACT

A mathematical classification of a family of edge detectors is presented. The nine edge detectors under consideration are of the enhancement/threshold type. Edge detection is an important part of the image processing sequence, as it is a heavily used segmentation routine. Presently there does not exist a classification scheme which completely accounts for the behavior of all existing edge detection techniques. This report defines two types of edge "enhancers," using the structure of the Image Algebra in which to embed the definition. The classification depends on the two distinct parts of every edge detector: the masks, and the function of the image and the masks. Eight of the edge detectors could be classified as one of the two enhancers, while the logarithmic edge detector was left unclassified. The Image Algebra was used as it is capable of expressing all image to image transformations and can be used as a general purpose algebra for presenting image processing concepts. Determination of criterion and image measures for optimizing edge detection using the enhancer definition is discussed, and suggestions for further research are given. The principle behind classifying edge detectors and using the classification to specify and evaluate image measures is to develop a method which in principle could be implemented in an automated target recognition (ATR) system.

Design and Analysis of Models of Large Space Structures

by

Douglas W. DeHart

ABSTRACT

The first step in designing any large structure is to develop a model of the structure and test that model under similar loading conditions. Much of the analysis of the models can be done using computer programs such as a finite element program which creates a finite element picture of the model and analyzes it when subjected to a variety of loading conditions. This is especially true for large space structures which cost a lot of money to build and to test in their natural environment. The main concern in designing large space structures is damping out internal vibrations which may cause severe deformations when the vibrations hit the natural frequencies of the structure. It is then essential to know what the natural frequencies of the structure are.

A BIOMECHANICAL STUDY OF ANTHROPOMORPHIC HEAD-NECK SYSTEMS

by

Brian J. Doherty

ABSTRACT

Hybrid II, modified Hybrid II, and Hybrid III anthropomorphic manikin head-neck assemblies were studied. Preparations were made to measure the kinematic and dynamic responses of these mechanical head-neck assemblies to abrupt decelerations imparted to the base of the neck by a pendulum test apparatus according to existing DOT specifications for Part 572 dummy compliance testing and recommended procedures for Hybrid III compliance testing. Measurements were made of the geometric and inertial properties of the pendulum and the modified Hybrid II and Hybrid III test specimens. The actual execution of these tests is planned for the upcoming year. The measured geometric and inertial properties and pendulum test performance standards were analyzed to determine inputs for both the Articulated Total Body (ATB) Model and the AAMRL Head-Spine Model (HSM). Data sets, which represent the Hybrid II head-neck system, were developed for the HSM and ATB Model. Simulations of the Hybrid II pendulum tests were performed and compared to experimental results to verify the assumptions used to define the Hybrid II head and neck structures and validate these data sets. More modeling work still needs to be done. Some additional tuning of the Hybrid II data sets is suggested. Modified Hybrid II and Hybrid III data sets need to be developed. Simulations of modified Hybrid II and Hybrid III pendulum tests need to be performed and compared to experimental results to validate these data sets.

MATERIALS EVALUATION AND FAILURE ANALYSIS OF VARIOUS ELECTRONIC
CIRCUITRY COMPONENTS OF AIR FORCE AIRCRAFT

by

Franklin J. Dunmore

ABSTRACT

This report contains the objectives, procedures and results of the work that was done by the author on failure analysis of various aircraft electronic components and related apparatus. Section III deals with the electrostatic discharge and surface resistivity test of a pair of antistatic gloves for handling electrical overstress sensitive electronic components (for example, field effect transistors). Section IV deals with solder strength tests and solder joint flaw inspections of printed circuit boards of F-15 aircraft. Section V deals with the study of the growth mechanism of Tin Whiskers. Section VI deals an accelerated lifetime study through thermal-shock treatment of Printed Circuit Boards of C-5B aircraft and of a newly designed Printed Circuit Board (PCB) from Manufacturing Technology Division.

THERMAL CHARACTERIZATION OF NEW THERMALLY STABLE MATRIX

MATERIALS

by

Michael F. Farr

ABSTRACT

Two different systems were studied, a 1:1 molar ratio of BCB/BMI and an oligomer of BCB. As part of the 50 gm evaluation thermal analysis of both systems and their constituents was performed. The BCB/BMI system had some type of impurity which affected the curing reaction. A large portion of the work was spent cleaning the system. Since the BCB oligomer system was pure, a large portion of the 50 gm evaluation was able to be completed. The oligomer system has promising properties for use as a high performance matrix material. Unfortunately, not enough work was completed on the BCB/BMI make an estimation of its possible usefulness.

Synthesis of Intermediates and Monomer of Polybenzothiazole

by

Christopher A. Feild

ABSTRACT

Intermediates in the synthesis of polybenzothiazole were prepared purified, and characterized by appropriate methods. Previously devised reaction routes were employed. Some optimization of yields was done in scale-up. One monomer was prepared. Finally, attempts to prepare intermediates with long chain alkyl substituents were made.

THE METABOLISM OF t-BUTYLCYCLOHEXANE

IN MALE FISCHER 344 RATS

By

Michelle J. Ferry

ABSTRACT

The study of metabolism of t-butylcyclohexane in male Fischer 344 rats was undertaken. The cyclic hydrocarbon was shown to be mildly nephrotoxic, causing the formation of hyaline droplets in the proximal tubule cells. Identification of the urinary metabolites confirmed the presence of cis-4-t-butylcyclohexanol, trans-4-t-butylcyclohexanol, 2-methyl-2-cyclohexylpropionic acid, and four stereoisomers of 4-t-butyl-1,2-cyclohexandiol. Two other major metabolites have not been identified. Kidney homogenate extract analysis showed no metabolites to be present.

DATA MANAGEMENT WITHIN THE SCHOOL OF AEROSPACE MEDICINE

by

Carl V. Frank

ABSTRACT

The report contains a summary of an investigation of human-computer interaction and its effect on the data within the United States Air Force School of Aerospace Medicine (USAFSAM). Data for the investigation was gathered primarily by interviewing staff personnel and observations by the researcher. After examining the data it was determined that there are areas that need improvement. These areas are centered around data validation and resource management. Suggestions were made to acquire new hardware and software, only after the School's present needs and growth requirements are understood.

SPEECH PRODUCED UNDER HIGH SUSTAINED ACCELERATION

Beverley A. Gable
Department of Psychology
Ohio University, Columbus, OH

ABSTRACT

The purpose of this study was to obtain preliminary data concerning the acoustic-phonetic structure of speech produced under high sustained acceleration. Acoustical measurements were made of a set of Air Force vocabulary words as spoken by two subjects at 1G and 6Gz. There were differences in both the durational and spectral characteristics of speech, though not always consistently for the two speakers. At 6Gz, vowel formants tended to centralize, and fundamental frequency in stressed syllables increased for both speakers. For one speaker, word durations increased consistently under acceleration while for the other speaker, the durational differences were inconsistent. Duration differences were primarily a function of changes in vowel duration. [Sponsored in part by the Air Force Office of Scientific Research/AFSC, United States Air Force, under Contract F49620-85-C-0013.]

A Study of the Probability Distributions of the Long
Term Variations of Acoustical Noise Over Time
of Various Military Environments

by

Michael Garner

Abstract

The probability distributions of the long term variations of acoustic noise over various Air Force military platforms were studied. It was found that the acoustical noise environments of aircraft such as the E-4B, EC-135, HC130 and F-15 have nearly Gaussian distributions. From the F-15 recordings the noise environments of several flight configurations were studied. All the flight configurations had identical nearly Gaussian distributions. On the other hand aircraft such as the EC-130 and P-3C have very non-Gaussian distributions. The turbo powered helicopter HH-53 was found to have an almost Gaussian distribution, but was slightly skewed toward lower variations in the acoustical noise intensity.

EXPOSURE OF POLYCARBONATE LENS TO
NATURAL ELEMENTS

by

Maurice B. Gilbert

ABSTRACT

Polycarbonate optics endure varied types of exposure when utilized by personnel. They function to increase visual acuity and serve as protectors of individuals eyes. Sixty (60) polycarbonate lenses are being tested for effects due to natural weathering on the integrity of the lens. Initial readings for each lens have been performed. After one (1) year's exposure comparative measurements will be taken to evaluate changes in the lenses. The intention is to generate base-line data for life-expectancy of the polycarbonate lens.

EFFECTS OF DOBUTAMINE ADMINISTRATION ON
SUSPENSION HYPOKINESIA/HYPODYNAMIA DECONDITIONING IN RATS

by

Beverly Elaine Girten

ABSTRACT

The primary objective of this study was to determine if the degree of deconditioning commonly seen with suspension hypokinesia/hypodynamia (H/H) in rats could be significantly altered by administration of dobutamine during the suspension. Initial dose finding experiments were conducted, then twenty-four animals were randomly assigned to one of four groups. The four groups were control saline (CON SAL), suspended saline (H/H SAL), control dobutamine (CON DOB) and suspended dobutamine (H/H DOB). The animals were 135 ± 3 days old at the time the treatments were started and the treatments were administered over 14 consecutive days. The data obtained indicate that when actual mass is considered there is significant atrophy of muscle and loss of body weight with H/H suspension. The interactive effect of dobutamine was significant in terms of loss of body mass and loss of soleus mass. When organ and muscle mass were normalized with regard to body weight, there were significant differences between CON SAL and H/H SAL groups with respect to the mass of the heart and adrenals and in three of four hindlimb muscles examined. These results have important implications for formulation of possible interventions with regard to changes brought about by simulated and actual weightlessness. Further investigation into these changes, and the mechanisms involved, appear to be warranted.

Experimental Evidence Supporting a Pharmacokinetic Model of
Uptake and Metabolism of Trichloroethylene in the Pregnant
and Lactating Rat

by

Ellen S. Goldey

Abstract

Time pregnant Fisher rats were exposed to Trichloroethylene (TCE) via drinking water, gavage, and inhalation. Dam blood and fetal blood were collected at specified times during pregnancy. Dam blood, dam milk, and pup blood were sampled at different times throughout lactation. These tissue samples were analysed by gas chromatography to determine concentration of TCE and one of TCE's primary metabolites, trichloroacetic acid (TCA). These experimental values were then compared to TCE and TCA concentrations determined by computer simulation using a pharmacokinetic model. In general the experimental values were found to support the accuracy of the model.

EFFECTS OF ACCELERATION STRESS UPON BLOOD LIPID LEVELS

BY

ALFRED W. GORDON

ABSTRACT

Serum total cholesterol and triglyceride concentrations of two individuals were measured after daily exposures to high gravitational forces (+Gz) simulating aerial combat maneuvers. The post-acceleration cholesterol levels were significantly higher (40-95%) than the normal resting levels. Serum cortisol levels were higher than the resting levels. This agrees with previous studies which have shown significant increases in serum cortisol levels after acceleration stress. Cortisol and total cholesterol values were significantly correlated ($r = 0.614$, $p < 0.05$) in one of the individuals of this study. Since cortisol is a hormone which influences lipid metabolism, there may be a causal relationship between the increased cortisol levels produced by acceleration stress and increased lipid levels. The lipid levels in the two subjects after acceleration exceeded the 90th percentile for the population as a whole. As such, they could be at high risk for subsequent coronary heart disease if they are exposed to high G-forces on a frequent basis.

An ancillary study was conducted to develop an electrophoretic method to rapidly separate and quantitate serum high density lipoprotein (HDL) subfractions HDL₂ and HDL₃. Serum levels of one of these subfractions may be a better predictor of coronary heart disease than total cholesterol. Serum α -lipoproteins isolated by affinity chromatography were separated into a number of subfractions by polyacrylamide gel electrophoresis. These subfractions were marked by the usual lipoprotein stains, and by filipin, a fluorescent, naturally occurring antibiotic which, reportedly, binds specifically to cholesterol. Identification and quantification of these HDL subfractions remain to be accomplished.

Microfracture Patterns in the Lumbar Vertebrae of *Macaca mulatta*

by

Nadia Clealure Greenidge

ABSTRACT

An experiment was conducted on forty isolated lumbar vertebral bodies excised from ten normal Rhesus macaques. The purpose of this investigation was to evaluate the effects of rate and percentage of vertebral body deformation on the mechanical properties and microfracture distribution in the lumbar vertebrae. Twenty vertebral bodies (L1 and L4) were used as controls. These specimens were disarticulated and examined macroscopically and microscopically to determine normal trabecular anatomy and the incidence of vertebral pathologies. Twenty additional lumbar vertebral bodies (L2 and L3) were disarticulated and mechanically loaded in axial compression within a test range of 10% to 30% deformation, in 5% increments, of the original specimen height. Each vertebral body was individually assigned an ultimate deformation percentage and a rate of deformation of either 5.25×10^{-3} m/min or 25 m/min. The effects of rate and percentage of deformation on the production of vertebral microfracture patterns and several mechanical parameters associated with vertebral injuries were determined.

Effects Of Coherent Scattering
on IR Absorption in Doped Semiconductors

by

Peggy Grigsby

ABSTRACT

The aim of this project was to develop an improved theoretical model for interpreting the excitation spectra from shallow dopants in semiconductors. The research focused on the specific problem of coherent scattering effects (optical channeling). These effects, produced by coherent multiple internal reflection from the plane parallel faces of an optically thin, two-sided polished wafer, compounds the problem of obtaining absorption coefficients, $\alpha(\omega)$ from transmission spectra, $T(\omega)$. The effect occurs in both Si and GaAs. The specific expression for $T(\omega)$ in the presence of channeling was worked out and the inversion of this relation was programmed to obtain $\alpha(\omega)$. When inversion of the coherent scattering formula did not give reasonable values for $\alpha(\omega)$, a combination of coherent and incoherent scattering formulas was used to minimize the spurious oscillations. The program was applied to obtain $\alpha(\omega)$ from FTIR transmission spectra which show channeling effects. This program was then compared to other programs available to eliminate fringes in data.

A Modification of the ACSYS Preprocessor Code
for use with the SAMSON2 Finite-Element Program

by

Brad L. Halverson

ABSTRACT

A finite-element preprocessor code called ACSYS has been modified to be compatible with SAMSON2, a powerful finite-element program owned by the Air Force Weapons Laboratory. This new modified code, known as SAMI, has undergone preliminary testing and appears to work satisfactorily. Because the SAMI code is so dynamic in its operation, all phases of the development of an input file could not be pursued in the ten week time period. There may still be minor errors in the SAMI code. These errors will undoubtedly be discovered as the code is used by AFWL personnel. The long-range objective of the Air Force is to integrate several, multi-purpose preprocessor codes, such as SAMI, into a complete interactive interface for the development of input for a wide range of finite-element programs.

Automation of the Method of Optimal Design

by

Charles Reif Hammond

ABSTRACT

The Method of Optimum Design is a systematic, non-numerical approach to constrained, nonlinear, optimization. In this method the mathematical characteristics of the optimization model are studied to determine the optimal solution of the problem. While the optimal solution to the problem is guaranteed to be correct in this method, much work is required of the analyst to develop this solution. This report describes the steps necessary to automate the Method of Optimal Design and the work that has been completed towards this goal. A companion report by Dr. G. E. Johnson presents the work on the automated optimal design of reinforced concrete footings.

EMPIRICAL CONFIDENCE INTERVALS FOR A VALIDITY COEFFICIENT UNDER RANGE

RESTRICTION: AN APPLICATION OF THE BOOTSTRAP

by

Jorge L. Mendoza

with the assistance of

Darren E. Hart and Amy B. Powell

ABSTRACT

Efron's bootstrap procedure was utilized to develop two computer intensive techniques for constructing confidence intervals on the unrestricted correlation parameter under explicit predictor restriction. One procedure bootstrapped the corrected correlation coefficient to obtain the interval, while the other one relied on the frequency distribution of the applicant test scores to generate the bootstrap confidence interval. The techniques were evaluated using a Monte Carlo procedure. The study assessed the techniques under a number of hypothetical selection situations. The results showed that bootstrapping the corrected correlation coefficient is a reliable technique for obtaining confidence intervals for the population correlation under most selection situations.

AN ANALYSIS OF RESIDUAL OUTPUT NOISE
FROM THE R.A.D.C. SPEECH ENHANCEMENT UNIT

BY

PETER V. HLINOMAZ

ABSTRACT

THE INTELLIGENCE ANALYSIS SECTION (IRAA) OF THE SIGNAL INTELLIGENCE BRANCH OF THE ROME AIR DEVELOPMENT CENTER (RADC/IRAA) HAS DEVELOPED AND IS CONTINUING TO DEVELOP A SPEECH ENHANCEMENT UNIT (SEU) WHICH REMOVES THREE KINDS OF NOISE: WIDEBAND RANDOM (WHITE) NOISE, IMPULSE NOISE, AND STATIONARY AND SWEEPING TONES. ALTHOUGH THE CURRENT WIDEBAND NOISE REMOVAL PROCESS IMPROVES THE SIGNAL BY REDUCING THE NOISE AS MUCH AS 15 DB, THE PROCESS PRODUCES A RESIDUAL NOISE WHICH APPEARS AS PEAKS IN THE OUTPUT SPECTRUM WHICH ARE NOT ASSOCIATED WITH THE SPEECH AND WHICH MOVE AROUND THE SPECTRUM IN A SEEMINGLY RANDOM WAY. TO IMPROVE THE WIDEBAND NOISE REMOVAL PROCESS, THE SEU MUST BE ABLE TO AUTOMATICALLY IDENTIFY AND REMOVE THIS RESIDUAL NOISE.

Knowledge for the ULCE Expert System

by
Stephen Horn

ABSTRACT

The knowledge needed for the ULCE expert system was identified and integrated. Boothroyd's assembly and Taguchi's producibility methods were studied for use in integrating manufacturing knowledge into the design knowledge. It was found that the design and manufacturing process operates in an universe of "lities" such as producibility, marketability, supportability, and inspectability. The Ishikawa technique was used to organize the "lities" into cause-and-effect diagrams. These diagrams were used to develop some IF-THEN rules. More work needs to be done in this area.

An Analytical Investigation for Designing an Energy
Storage Container for Storing Lithium Hydride
Between 300K and 1200K

by

Jamal A. Hussein

ABSTRACT

Stresses on a spherical container was considered for storing lithium hydride between 300K and 1200K. The materials investigated for the container shell were silicon carbide layer sandwiched between two thin layers of molybdenum. Silicon carbide and molybdenum were chosen for their properties at high temperatures. The pressure generated on the shell due to the thermal expansions of lithium hydride was determined using elastic theory. The corresponding container thickness required to withstand this pressure was found as a function of the assumed properties of LiH and sphere radius. Finally, the analysis shows that the ratio of the container thickness to the outer radius is constant ($t/r = 0.11$).

Modeling of Human Body Movement

by

Patrick Hannon and David Jansen

ABSTRACT

The Articulated Total Body (ATB) model is used to simulate biodynamic responses due to forces on the human body such as localized contact forces, aerodynamic drag, or internal muscular forces. Validation and possible improvement of the model was investigated through two approaches. A skilled motor performance, the overhand baseball throw was selected as the basis for the validation study, and three-dimensional experimental data from human subjects were obtained. In the first approach, muscle forces derived from the literature were input to the model for the right upper limb. The time courses for the muscle forces were obtained from electromyography studies of overarm throwing. Good statistical correspondence between the experimental data and the output from the simulation resulted. The second approach involved prescribing the motion of a single joint (the right knuckle) and adjusting other parameters of the ATB model to obtain correspondence with the experimental data. No muscular forces were involved in this approach. Significant statistical correspondence resulted, though not as high as with the first approach. Recommendations for further validation and development of the ATB model were made.

NOISE ANALYSIS AND REDUCTION FOR THE AFGL
INFRARED FOCAL PLANE ARRAY SPECTROMETER

by

Karl K. Klett, Jr.

ABSTRACT

An infrared focal plane array spectrometer has been developed by the Air Force Geophysics Laboratory, sensitive to the 8.0-14.0 micron range of the spectrum for use on the University of Wyoming's 2.3 meter infrared telescope. Due to the low signal/high sky noise ratio expected for the Wyoming telescope at infrared wavelengths, it is has been necessary to improve the system to approach the expected level of sky noise. It was determined after testing that improved grounding techniques were required since unwanted digital noise was being introduced into the system signal reference grounds. The separation of digital, analog, and signal reference grounds seemed to reduce the overall system noise. Additionally, the use of coadding was found to greatly improve the signal to noise ratio.

Structural Optimization Using Bending Elements

by

Raymond M. Kolonay

ABSTRACT

Minimum weight design of plane-framed structures subject to stress and displacement constraints is presented. The finite element method is used for the structural analysis while two separate methods are being compared for the optimization algorithm, non-linear mathematical programming and the optimality criterion. The structures being considered are assumed to be linear elastic, composed of isotropic materials, and under static loads. Some differences between the use of membrane elements as opposed to bending elements for structural optimization have also been investigated.

Swirling Flows in Dump Combustors

by

Mo Samimy and Craig A. Langenfeld
The Ohio State University
Department of Mechanical Engineering
206 W. 18th Street
Columbus, OH 43210

ABSTRACT

A series of experiments were conducted to study isothermal swirling flows in a dump combustor configuration. A two-component coincident LDV system was utilized for detail mean flow and turbulence measurements in the axial and tangential directions. To have optical access for two-component measurements and to minimize disturbances, a small flat window was used and the inlet to the combustor was moved relative to the combustor by using a novel traversing system. Two constant angle swirl generators with swirl numbers of 0.3 and 0.5 were tested. Only 0.5 swirler generated sufficient axial pressure gradient to produce central recirculation which extended approximately 4.5 times of the step height downstream of the expansion plane. The corner recirculating flows were present in both cases with a smaller recirculating region in the stronger swirler. Very large scale turbulence structure was measured in the central core of both flows; the structure was extremely large in the shear layer between the wake behind the hub and the main flow. The decay of large scale motion was very rapid in the stronger swirler flowfield. While 0.3 swirler flowfield became a single solid-body rotational flow after approximately two combustor diameters, the 0.5 swirler flowfield was combination of solid-body rotation at the central core and constant angle swirl flow outside of the central core even at four combustor diameters downstream.

THERMAL STABILITY STUDIES OF STRUCTURE-PROPERTY RELATIONSHIP
OF VARIOUS SILAHYDROCARBON LUBRICANTS.

by

Tieu-Binh Le and Vijay K. Gupta

Abstract

Thermal stability studies of various silahydrocarbon fluids ($R-Si-(n-C_8H_{17})_3$) were investigated by the micro-thermal stability test followed by GC, GC/MS analysis, kinematic viscosity measurements, and IR spectroscopy analysis. It has been found that saturated substituent in the silahydrocarbon molecule tends to decompose as subjected to thermal stress, whereas the silahydrocarbons with an unsaturated substituent group lead to polymerization under the same conditions. Thermal stability studies of the fluid $CH_3-Si-(n-C_8H_{17})_3$ were performed as a function of temperature and time. It was observed that the above fluid did not decompose significantly up to 725F (385C) for 6 hours stress time, but it decomposed almost completely when stressed for 6 hours at 800F (426.7C).

Computer Software Development in a
Study of Executable Image Efficiency

by

Mark Lisee and Martin A. Patt

ABSTRACT

Computer software was developed to support a study comparing the efficiencies of executable-image codes generated for a real-time LIDAR application. Programs were compiled and executed under the VMS operating system on a Digital Equipment Corporation VAX-11/780 Mainframe computer. Three languages were tested: C, FORTRAN, and BASIC. Assembly languages software (MACRO) was developed to provide a benchmark.

Optimization of a Material to be used to detect
Incident Microwave Radiation by IR Imaging

by

Robert K. Littleton

ABSTRACT

A material to be used to measure pulsed microwave radiation by means of IR imaging was determined by optimizing various material parameters. The material must absorb as much of the incident power as possible in order for it to heat up during the short duration of the pulse. By use of an existing computer program, the material parameters were varied to give a material with the highest possible absorption, lowest possible reflection, and low thermal mass. However, appropriate samples of the material were not available. A computer program was also developed to calculate the electric field strength inside the material. Also, the response of resistors to known currents was experimentally determined. More experimental work with materials needs to be performed in order to correlate theory with observation.

SYNERGISTIC EFFECTS OF ANTIMALARIAL DRUGS AND HYPEROXIA

ON THE GROWTH OF MALARIA PARASITES IN CULTURE

by

George Albert Liu

ABSTRACT

We hope to quantitatively determine the effects of oxygen on viability of Plasmodium falciparum growing in continuous culture in human erythrocytes with and without other anti-malarial drug therapy. Three different series of experiments were executed. In the first series of experiments, falciparum cultures were exposed to different pressures and times of hyperoxia. Results were not conclusive and more trials will have to be executed. In the second experiment, parasites were exposed to one atmosphere pressure of oxygen for times ranging from 1 hour to 16 hours. There was marked inhibition of growth after only 4 hours of incubation under one atmosphere pressure of oxygen. This result needs to be reproduced. It might be a possible to use one atmosphere of 95% oxygen to treat malaria in humans in the future. The third series of experiments tried to determine if there is any synergistic action of oxygen and some of the more commonly used antimalaria drugs. No synergy was found, but more trials must be done and other drugs tested.

THE METABOLISM OF ISOPROPYLCYCLOHEXANE
IN MALE FISHER 344 RATS

By

Isabel Lopez

ABSTRACT

The investigation of the metabolism of isopropylcyclohexane by Fisher 344 male rats was conducted to determine whether a branched chain on a cyclohexane nucleus could alter the non-renal toxicity of cyclohexane. Eight male Fisher 344 rats were dosed by gavage with isopropylcyclohexane on alternate days for 14 days. Urine samples were collected 48 hours after the first administration. Four control rats were dosed with distilled water and their urines also collected. In general, rats exposed to the cyclichydrocarbons exhibited small average weight loss when compared to the control group. Nephropathy was apparent in all rats treated with isopropylcyclohexane. The major metabolites found in the urine samples and kidney extracts were (cis and trans) 4-isopropylcyclohexanol, 2-cyclohexylpropionic acid, 2-cyclohexyl-1,3-propane diol and 4-isopropyl-1,2-cyclohexane diol.

A Comparative Study and Evaluation of Four Atmospheric Dispersion Models
with Present or Potential Utility in Air Force Operations

by

Thomas A. Carney and Michael M. Lukes

ABSTRACT

Four models of atmospheric dispersal that might be used for toxic or hazardous chemicals were evaluated and compared to experimental data. The models were evaluated with respect to potential and desirability for use in Air Force applications considering such factors as theoretical foundation, validation history and accessibility of results.

For most general applications, the AFGL AFTOX model is favored; however, the current lack of a module for simulating the behavior of a heavier-than-air-gas (HTAG) in AFTOX favors the use of Radian's CHARM in HTAG situations if limited flexibility in the output format is acceptable.

The models designed for instantaneous or explosive releases, PUFF and TRPUF, are very similar and produce substantially equal results with minimum effort when comparable input specifications are used.

The comparison of these models to two measured releases was used to highlight model features and develop understanding of model operations. The overall performance of the models against the measured data was comparable to previous comparisons and, in general, the model predictions were reasonable and consistent; the few exceptions are noted.

A LOAD-BALANCING MODIFICATION TO A. GEORGE'S INCOMPLETE NESTED DISSECTION
ALGORITHM FOR MAPPING A COMPACT IRREGULAR QUADRILATERAL FINITE-ELEMENT
MESH ONTO THE HYPERCUBE PARALLEL PROCESSING ARCHITECTURE

by

Wayne R. Lundberg

ABSTRACT

Many types of problems can be analyzed using the Finite Element Method of simulating physical systems. The main emphasis of this work concerns modelling of plastic deformation via ALPID (Analysis of Large Plastic Incremental Deformation). In it's current formulation ALPID uses a planar mesh of quadrilateral elements which are analyzed iteratively at each step. Each elemental stiffness matrix is generated and assembled into the global K-matrix, which is then inverted to find nodal velocities. These are compute-intensive steps and thus the total solution time is relatively long on a sequential machine. It is demonstrated herein that ALPID can be modified to process groups of elements, with each group on a separate processor. A general machine algorithm for dividing the mesh is given. It is required to equalize the work done by each processor, and to minimize the inter-processor communications. A resolution of these requirements for any FEM mesh is only possible using a combination of results derived from the references.

Guide to ISPX:
The Interactive Signal Processing Executive

by
William A. Marty

ABSTRACT

The applicability of several spectral estimation techniques to the Digital Receiver problem was studied. Software tools for comparison of the characteristics of the different techniques were developed. Specifically, the Interactive Signal Processing executive was developed. ISPX was then used to run a large number of test cases on the various methods, and plot the results. Based on plots of these preliminary test cases, the kernel of a strategy for optimum detection and frequency estimation was developed. More work, using this kernel as a basis, will likely yield a more practical solution of the detection and estimation problem.

Polynuclear Aromatic Hydrocarbons
in Particulate Turbine Engine Exhaust
and From Combustion of Single Compound
Fuels

By

Dr. William D. Schulz and Miss Mary R. McGill

ABSTRACT

Particulate exhaust samples of turbine engines and a combustor rig were sequentially extracted with methylene chloride, benzene-methanol and toluene. No solvent was found superior to methylene chloride for the entire range of polynuclear aromatic hydrocarbons (PNAs) in these samples.

Turbine engine exhaust samples from three engines at four different power settings were extracted, concentrated and analyzed. Analysis was by G.C. (F.I.D.) and GC/MS. Blanks and samples contained large amounts of plasticizers and filter loadings were too low for reliable quantitation or identification by GC/MS. G.C. (F.I.D.) analysis and identification by retention times indicated that PNA concentration was highest at the "idle" power setting and that it was also higher for the one after-burning sample.

Samples of exhaust particulates from a bluff body combustor, burning pure acetylene, propane, propene, butane, 1-butene and isobutene were extracted, concentrated and analyzed. Soot yield of the fuels was not determined. Higher concentration of higher molecular weight PNAs were found for the aliphatic compounds with unsaturation and for isobutene, with unsaturation and branching.

Electroencephalography and Online Analysis:
An Evaluation of Some Available Choices

by

Jennifer McGovern-Weidner

Abstract

Online analysis of electroencephalographic data is a desirable product. There are a number of analysis methods for EEG data and for data collected over time. Six analyses were evaluated and some were tested for effective use in online realtime analysis. Recommendations for future use were made. This project is ongoing and no final conclusions were made.

Program code: Style and conventions

by

Dara Merenski

ABSTRACT

This report contains guidelines and conventions concerning programming style and documentation for the in-house software development at the Air Force Human Resources Lab Logistics and Human Factors Division Combat Logistics Branch in Dayton. The conventions include how to's for commenting, structuring, and documenting code so that readability, understanding, and maintainability is enhanced. The first section gives general conventions to be universally followed for all programming languages. The following sections contain guidelines applicable to specific programming languages. Some of the guidelines were left inspecific so as to allow the programmer creativity in the programming process. The purpose of this report was not to stifle the programmer but to standardize much of the coding so that programs and packages can be easily read, understood, and maintained. Programmers can easily check the programs available to see if they fit a given problem and thereby reduce duplicate and redundant code.

Synthesis and Time to Explosion Studies
of Some Potential High Explosives

by

PETER D. MEYER

A B S T R A C T

EAK (a mixture of 1,2-Ethanediammonium Dinitrate, Ammonium Nitrate (AN) and Potassium Nitrate (KN)) was dropped as an Air Force insensitive high explosive (IHE) several years ago. It is hoped that by doing time to explosion studies on other alkyldiammonium dinitrate systems that insight will be gained as to the reasons why EAK failed several of the required tests before becoming an IHE.

Polybenzimidazoles: Solubilization, Modification, and
Synthesis

by

D. Roger Moore

Abstract

Rigid rod polybenzimidazoles (PBIs) were solubilized in non-polar aprotic solvents using a strong base proton abstraction technique previously found to be effective for poly(p-phenyleneterephthalamide). The soluble PBI anion could be grafted with acrylamide to form PBI-g-Nylon 3 copolymers which also showed improved solubility over unmodified PBIs. The synthesis of N-phenyl substituted PBIs using orthoester monomers and active ester solvent systems was found to be ineffective. High purity hexamethyl-orthoterephthalate could be produced by sublimation of crude material, which was heretofore not reported in the literature. This monomer could prove useful in synthesizing other types of PBI polymers.

MBTI Psychometric Study of United States Air Force
Aircrew Personnel

Eric V. Morris

ABSTRACT

A retrospective study of MBTI scores of thirty-four aircrewmembers from Air Force files were analyzed and integrated to yield information of personality structure and patterns among the group. Comparisons with other sample populations were made, as well as with a previous study from the School of Aerospace Medicine.

CHEMICAL AND ELECTROCHEMICAL BEHAVIOR OF ALUMINUM ELECTRODES
IN ACIDIC 1-METHYL-3-ETHYLIMIDAZOLIUM CHLORIDE/ALUMINUM
CHLORIDE ROOM TEMPERATURE MOLTEN SALT ELECTROLYTES

by

Russell Moy

ABSTRACT

Rotating cylinder aluminum electrodes were used to study the deposition and dissolution of aluminum from slightly acidic 1-methyl-3-ethylimidazolium chloride/aluminum chloride room temperature molten salt electrolytes. A steady state current response could not be obtained for the oxidation or reduction of $X_{AlCl_3} = 0.510$ electrolytes. Steady state cathodic current response was observed when $X_{AlCl_3} = 0.505$, but the Tafel region was poorly defined. Cathodic polarizations of the working electrode resulted in the deposition of aluminum. However, current response was peak limited during anodic and some cathodic cyclic voltammograms of the rotating electrode. This type of behavior is indicative of the formation of a passive film.

OBOGS STUDIES

By

Glenn Munkvold

ABSTRACT

Studies were done in three areas of on board oxygen generation system (OBOGS) research. First, a temperature correlated computer model of the F-16 type OBOGS was implemented, and computer codes were written to facilitate use of ReGis graphics on Dec VT terminals. Work was also begun on data formats to be used on an improved model being developed. Second, experiments were done concerning the possibility of reducing the required bed size for an OBOGS unit through the use of oxygen enriched feed. Such feeds may be available as exhaust from on board inert gas generators. While not conclusive, these experiments indicate that any bed size reduction achievable with these feeds may be small, especially as compared to required overdesign of the beds for safety reasons. Third, a chromatographic technique for determination of adsorption isotherms was attempted. The results from these experiments were not physically reasonable. Reasons for the failure of this experiment are being explored.

EFFECTS OF ACCELERATION STRESS UPON BLOOD LIPID LEVELS

BY

CONRAD R. MURRAY

ABSTRACT

Serum total cholesterol and triglyceride concentrations of two individuals were measured after daily exposures to high gravitational forces (+Gz) simulating aerial combat maneuvers. The post-acceleration cholesterol levels were significantly higher (40-95%) than the normal resting levels. Serum cortisol levels were higher than the resting levels. This agrees with previous studies which have shown significant increases in serum cortisol levels after acceleration stress. Cortisol and total cholesterol values were significantly correlated ($r = 0.614$, $p < 0.05$) in one of the individuals of this study. Since cortisol is a hormone which influences lipid metabolism, there may be a causal relationship between the increased cortisol levels produced by acceleration stress and increased lipid levels. The lipid levels in the two subjects after acceleration exceeded the 90th percentile for the population as a whole. As such, they could be at high risk for subsequent coronary heart disease if they are exposed to high G-forces on a frequent basis.

An ancillary study was conducted to develop an electrophoretic method to rapidly separate and quantitate serum high density lipoprotein (HDL) subfractions HDL₂ and HDL₃. Serum levels of one of these subfractions may be a better predictor of coronary heart disease than total cholesterol. Serum α -lipoproteins isolated by affinity chromatography were separated into a number of subfractions by polyacrylamide gel electrophoresis. These subfractions were marked by the usual lipoprotein stains, and by filipin, a fluorescent, naturally occurring antibiotic which, reportedly, binds specifically to cholesterol. Identification and quantification of these HDL subfractions remain to be accomplished.

Heart Rate Self-regulation: The Effects of
Increasing Cognitive Demands

by

Victoria Tepe Nasman

ABSTRACT

A parallel processing scheme is proposed in which the left cortex and the hypothalamus/autonomic nervous system are co-processors. A coupling-uncoupling mechanism is hypothesized. The study is an attempt to observe and define the point at which cognitive demands interfere with ability to maintain self-regulated heart rate through biofeedback.

Preliminary results indicate reliable differences in EEG signal strength observed during various experimental treatments, including cognitive task performance and biofeedback techniques. Such shifts in EEG signal strength will serve as a measure of the shift from biofeedback self-regulation (i.e., coupled state) to cognitive dedication in which self-regulation becomes impossible (i.e., uncoupled state).

MODERNIZATION OF STATISTICAL SOFTWARE

by

Sharon E. Navard

ABSTRACT

Due to improvements in testing, instrumentation, and statistical methodology, several AD/KR statistical programs, used to estimate the parameters associated with various range testing applications at Eglin, had become obsolete and required modernization. These programs were investigated to determine which statistical analysis techniques were being utilized. The techniques were changed if they contained errors or if there was a better statistical method for computing the results. The efficiency of the routines was also examined, and more efficient methods of doing the numerical calculations were implemented where possible. The graphics routines were updated to run on the laser plotter, obsolete code was replaced with a more standard version of FORTRAN, and the program documentation was altered to reflect all changes made.

VISUAL CHARACTERISTICS IN PILOTS WITH CENTRAL SEROUS RETINOPATHY

by

Bernadette P. T. Njoku

ABSTRACT

This study is carried out on forty(40) pilots who acquired central serous retinopathy at ages ranging from twenty-four(24) to forty-nine (49) years old. The compiled parameters consist of visual acuity, before, during and after, results of Amsler grid tests, Goldmann field of vision, monocular color vision defects, depth perception tests, fundusoscopic examinations and fluorescein angiography tests for retinal pigment epithelial defects. Also collected is data on treatment of central serous retinopathy -- Argon laser therapy, or other -- to hypothesize on the improvement, if any, of visual characteristics post-therapy. Finally, the effect on flight status of these pilots is indicated, that is, whether the pilot continues flying or discontinues flying as a result of the disease. The study furthermore includes information on the number or recurrences and which eye it recurs.

RESIDUAL CARRIER CONCENTRATION DEPENDENCE ON THE ARSINE
PRESSURE FOR GALLIUM ARSENIDE GROWN BY HYDRIDE-BASED VPE

by

David Paul Norton

ABSTRACT

A theoretical treatment is given on the residual impurity concentration (silicon) obtained in gallium arsenide grown by means of a hydride-based vapor phase epitaxy method. Particular attention is given to the dependence of the carrier concentration on the initial partial pressure of arsine introduced into the system. It is shown that the carrier concentration depends on the inverse of the square of the initial arsine partial pressure. This treatment indicates that surface-adsorbed As_2 molecules play a major role in the silicon incorporation process. Theoretical and experimental results are compared.

FREQUENCY AND TEMPORAL INFORMATION PROCESSING

by

Roland L. Palmer

ABSTRACT

Two experiments were conducted. In the first, the effect of the variables stimulus exposure and intention-to-learn were manipulated to determine their effect on frequency processing. The manipulation of these variables served as a direct test of a currently popular theory that assumes frequency information is encoded automatically. If valid, then the effects of these variables should be negligible. The second experiment was a direct test of a broad class of temporal memory theories that assume temporal information order judgments are based on inter-item associations formed during encoding. As a test of this assumption, variables were manipulated that served to either enhance or inhibit the formation of inter-item associations. For both experiments, data collection was still in progress when this report was filed.

Parametric Numerical Simulation For
Hypersonic Flow Over A Compression Ramp

by

Daniel S. Park

ABSTRACT

A second order accurate MacCormack's explicit finite difference scheme is used to solve the complete compressible Navier Stokes equation for hypersonic flow over a two-dimensional compression ramp. Four different types of grids were used to study the grid optimization problem. Our results agreed well with the experimental data by Holden and Moselle for Mach number 14.1 and Reynold's number 1.04×10^5 with ramp angle of 24 degrees. The details of pressure, skin friction coefficient and heat transfer coefficient are given.

Characterization of Alkoxide Derived Zirconia Toughened
Fused Silica

by

April G. Parker

ABSTRACT

Silica and zirconia dispersed glasses were prepared with up to twenty mole percent of zirconia from alkoxide precursors. Tetragonal zirconia was observed by x-ray diffraction and a slight increase in toughness was observed. The final compacted material varied in amount and type of crystallinity, depending on the zirconia content, and vacuum hot pressing conditions. The samples were, on the average, 93% of the theoretical density of 2.37 g/cc

On the Measurement of Variables Impacting the
Performance of Flightline Maintenance Crews

by

Deborah L. Parker

ABSTRACT

Background research was conducted related to an ongoing project concerned with variables that potentially will impact the performance of flightline maintenance crews. A literature review was conducted in order to determine whether appropriate methods exist for the measurement of variables that are determinants of performance on the flightline. Literature on vigilance, information processing, individual differences, performance, and behavioral measures was reviewed for this purpose. The review indicated that certain personality variables and group characteristics are undoubtedly related to effectiveness and should be considered in relation to the performance of flightline maintenance crews.

Image Algebra Preprocessor and Image Algebra Executive

by

Werner Kurt Perry

ABSTRACT

The image processing field is characterized by very complex algorithms that do not translate well into any conventional programming language. It is for this reason that Dr. Gerhard X. Ritter of the University of Florida has been researching the feasibility of an Image Algebra. Dr. Ritter has isolated a heterogeneous Image Algebra consisting of several different types of operands as well as different operations among those operands. The Image Algebra Preprocessor incorporates these operands and operations to create a image processing environment that allows the user to create efficient algorithms rapidly. The Image Algebra Preprocessor was written in FORTRAN and produces FORTRAN-77 from a FORTRAN-like code. The Image Algebra Executive software allows user to implement Image Algebra Preprocessor algorithms on groups of images without having to constantly interact with the software.

Decentralized Control of
Large Flexible Space Structures

by

Frank Mark Pitman

ABSTRACT

Decentralized control is considered as an alternative to centralized control techniques such as pole placement, state feedback, and optimal control as a tool for controlling undesirable vibrations in large flexible space structures (LFSS). The method presented here allows one to determine the decentralized system equations directly from the centralized system equations. Furthermore, this formulation neither requires a coordinate transformation nor ignores any coupling between the subsystems. This makes the method both computationally attractive and reliable. The idea of optimal control is applied to the decentralized subsystems in an attempt to determine the optimal controller for the total system. The necessary equations are developed in the paper, however, the method still needs to be programmed and tested on various cases to ensure the validity of the results. This work should be extended to include provisions for both variations in the system parameters and external disturbances.

EMPIRICAL CONFIDENCE INTERVALS FOR A VALIDITY COEFFICIENT UNDER RANGE

RESTRICTION: AN APPLICATION OF THE BOOTSTRAP

by

Jorge L. Mendoza

with the assistance of

Darren E. Hart and Amy B. Powell

ABSTRACT

Efron's bootstrap procedure was utilized to develop two computer intensive techniques for constructing confidence intervals on the unrestricted correlation parameter under explicit predictor restriction. One procedure bootstrapped the corrected correlation coefficient to obtain the interval, while the other one relied on the frequency distribution of the applicant test scores to generate the bootstrap confidence interval. The techniques were evaluated using a Monte Carlo procedure. The study assessed the techniques under a number of hypothetical selection situations. The results showed that bootstrapping the corrected correlation coefficient is a reliable technique for obtaining confidence intervals for the population correlation under most selection situations.

STUDY AND CONTROL OF ORGAN-TYPE OSCILLATIONS
IN A HORIZONTAL COMBUSTION TUNNEL

by

Surya Raghu

ABSTRACT

Organ-pipe type oscillations are a common occurrence in combustion systems. These oscillations are important because of the noise and unsteady combustion that is associated with the instability. In this report, the efforts undertaken towards control of such instabilities and some properties of the flame in such a combustion system are discussed. Considerable reduction in the noise (10-20 dB) was achieved by means of positioned screens and heat addition. Luminosity measurements indicate a strong coupling between the pressure and the heat release rate fluctuations in agreement with the Rayleigh criterion.

A Locally Implicit
Numerical Method

by

MARK L. RATCLIFF

ABSTRACT

The stability and application of a locally implicit numerical method were investigated. The method was analyzed for two particular cases. First, difference equations were written at two grid points in the spatial direction. Second, the difference equation was written at one spatial node. Both cases proved the scheme stable after some modifications. Certain Courant Number restrictions and parameter ranges were discovered. Work is continuing for negative Courant Numbers in both cases.

Adaptive Grid Generation for Viscous Flow Problems

By

Christopher W. Reed

ABSTRACT

An adaptive grid generation procedure is developed for viscous flow problems. The equations governing the adaptation are based on a variational statement resulting in a set of elliptic governing equations in which adaptation can occur independently in each coordinate direction. The method allows for explicit control of adaptation and orthogonality; however, smoothness of the grid is implicit in the equations. The adaptive grid generation equations respond properly to the control functions and are capable of providing the extremely refined mesh in the boundary layer regions. The grid generation equations are coupled with a thin layer Navier Stokes Code to solve a transonic axisymmetric projectile problem. A converged solution, however has not yet been obtained and it is necessary to investigate further the coupling procedure.

An Ultrastructural Study of Mossy Fiber Terminals
Isolated from the Mammalian Brain

by

Brenda J. Claiborne

Greg Reger

ABSTRACT

A preparation of mossy fiber terminals isolated from the hippocampal formation of the rat brain was characterized at the ultrastructural level. Results indicated that the fraction was composed primarily of synaptic terminals, of which at least 31% contained zinc and were therefore terminals of the mossy fibers or their collaterals. All of the morphologically identifiable mossy fiber terminals contained zinc, showing that zinc is retained in the terminals during the isolation procedure. In addition, ultrastructural examination of the other fractions generated during the isolation procedure showed that each fraction was composed of the expected subcellular organelles.

Response of Downslope and Florida Mesoscale Wind System
to Physiographic Features

by

Anthony E. Restaino

ABSTRACT

Numerical simulations of nocturnal slope flow were conducted using a 2-dimensional version of the Tripoli-Cotton CSU model. Variations of mountain height and soil moisture altered the intensity of downslope flows. And, Katabatic flow intensified with an increase in mountain height. Moreover, high soil moisture was found to suppress downslope flow. Significant perturbations developed in the katabatic layer after one hour of model run time. These perturbations excited gravity waves in the free atmosphere above the surface layer where potential temperature increased roughly 0.03 °C/Km.

A separate experiment for a Florida case study showed that soil moisture variations affected mesoscale wind fields, cloud formations, and precipitation.

ATMOSPHERIC MODELING FOR OPERATIONAL TACTICAL DECISION AID

by

Dennis W. Richardson

ABSTRACT

The Tactical Decision Aid (TDA) is an integrated target/atmosphere/sensor model that is used to estimate target acquisition ranges for infrared sensors. It employs an extensive 8000 plus-line computer code, LOWTRAN, to evaluate the atmospheric extinction of infrared signals for various climatological conditions. The Operational TDA (OTDA) is a simplified version of the TDA housed on a hand-held computer. It is intended for field use. Since LOWTRAN is too voluminous to be employed for the OTDA, pre-computed extinction data tables are currently in use. The process of manual input of data from the tables to the OTDA is cumbersome and is prone to erroneous readings. Therefore, it is proposed to develop compact atmospheric extinction models which may be coded onto hand-held computers. Various types of atmospheric extinction, which are significant for the TDA application, were considered and simple models were developed based on the LOWTRAN computation.

AN EXPERIMENT TO CHARACTERIZE THE
TURBULENT FLOW FIELD OF A CIRCULAR FREE JET OF HELIUM

by

Kyle Ross

ABSTRACT

An experiment designed to characterize the turbulent flow field of a circular free jet of helium is described. This experiment employs laser Doppler anemometry. Design of this experiment was part of the initial effort of research directed at relating certain velocity statistics of a basic flow to the laser beam transmission characteristics of the same flow. Of special interest is relating defects in laser beam quality to the existence of large scale coherent turbulent flow structures in the optical path. Work subsequent to the laser Doppler anemometry study will characterize the same jet flow by laser interferometry. Correlations between statistics described here and information resulting from the interferometry work are expected. Such correlations will relate the velocity statistics and laser beam transmission characteristics of the jet flow field.

The equipment configuration developed over the summer is described as are the methods used to extract various velocity statistics from the laser Doppler velocimetry data.

Weather Attenuation

by

Susan Ellen-Ann Sadofsky

ABSTRACT

38 GHz data from Lincoln Laboratory Experimental Satellite #8 (LES-8) taken during the ARL Weather Attenuation Program (March - May 1986) was converted from raw counts to signal strength values. These values were plotted by hand in order to make comparisons and verify a computer program which converted the raw data and plotted the values.

MBTI Psychometric Study of United States Air Force
Aircrew Personnel

John Yolman Salinas

ABSTRACT

A retrospective study of MBTI scores of thirty-four aircrewmembers from Air Force files were analyzed and integrated to yield information of personality structure and patterns among the group. Comparisons with other sample populations were made, as well as with a previous study from the School of Aerospace Medicine.

Analytical Computer Modeling of the
NPN BICFET Device

by

Dennis Whitson and W. David Schmidt

ABSTRACT

A computer program was written for an analytical model of the NPN Bipolar Inversion Channel Field Effect Transistor (BICFET) device. From this analysis a number of conclusions can be drawn: (1) Type of metal used is extremely important; (2) The "Fermi Factor" which determines the electron population in the spike layer could be crucial and the spike layer may have to be grown in the semi-insulator rather than the semiconductor; (3) Collector stretch may be negligible at realistic current density values; (4) For the GaAs/AlGaAs system a functioning NPN device may be easier to fabricate than a PNP device; (5) There are two independent gain factors: (a) the exponential argument which depends on ψ_{ms} and (b) p_0 which depends only on the density of the spike layer dopant.

JET DIFFUSION FLAME

by

James P. Seaba

ABSTRACT

Three different gases, and nozzles were used at various flow rates in a jet diffusion flame. The flame was seeded with TiO₂ particles and laser sheets were used for flow visualizations of the flame. The visualizations were recorded by both still photographs and motion pictures. Two different phenomena were being evaluated, flame lift which occurred at high flow rates, and structure movement which could only be visualized at low flow rates.

The outer structure and flame bulge of the flame were digitized using the motion pictures. Therefore the velocity of the structures were determined at various flow rates for different gases and nozzle sizes.

MECHANISMS OF CHROMATIC CONTRAST

by

Laura Sewall

ABSTRACT

The question of whether chromatic contrast is recurrent or non-recurrent was explored using psychophysical procedures. Stimuli were presented to four observers by a three-channel maxwellian view optical system. The target consisted of a four-element bulls-eye pattern. The central spot was varied in wavelength in order to determine each subject's unique yellow using a variety of color conditions for the several annuli. The basic experimental question was whether or not the contrast effect of a region of the visual field is influenced when its appearance is altered by contrast with another region of the visual field. Although more research is required, we tentatively conclude that contrast-induced color appearance has no effect on adjacent regions of the visual scene. Thus, chromatic contrast seems to behave like a non-recurrent network.

Computer Simulation of Physical Phenomena

by

L. Taylor Simpson

ABSTRACT

NO Relaxation by NO and by Argon can be modeled using a set of three coupled differential equations. The computer was used to numerically approximate the solution to these equations. The computer was then used to compare the relaxation curves obtained using different values for the relaxation rates.

Another program was written to match phenomena observed from the heat pipe oven with a transition within the cesium atom. The program was used to successfully identify several of the emission wavelengths observed by Dr. Christian.

A DISCUSSION OF BOUNDARY ELEMENT METHODS

by

Jim Sirkis

The boundary element solution to transient potential problems is presented. In doing so, steady potential problems are also discussed. Analytical and implementation difficulties associated with boundary element methods are exposed through four increasingly more difficult example problems. The first example discussed is heat conduction through an infinite square prism. Each example thereafter examines more complex governing equations and boundary conditions. The potential discussion culminates with the boundary element solution to transient heat conduction through an infinite circular cylinder with heat conduction through its surface. Finally, the extension of boundary element methods from scalar to tensor problems is described.

Automatic Program Generation from Specifications

by

Michael J. Slifker

ABSTRACT

A skeletal system for generating correct Prolog programs from specifications was developed. We have limited ourselves to the subclass of problems which are equivalent to reduction to normal forms with respect to a set of rewrite rules. The system takes, as input, a set of declarations and type definitions of the basic elements of the specification, along with equational descriptions of a set of transformations and predicates. A Prolog program is produced which, given input of the proper type, generates a consistent sequence of transformations on the input, ultimately resulting in an output object of the same type satisfying a distinguished output predicate.

A Study of the Use of Optical Combustion Diagnostics
on Premixed Flames and Solid Rocket Propellant Flames

by

Barry J. Stagg

ABSTRACT

A vidicon camera was used to detect the presence and relative concentrations of OH radicals in a premixed methane/oxygen flames and solid rocket propellant flames. This type of apparatus detects radicals in the excited state. In the premixed flames, OH concentrations were studied as a function of the air/fuel ratio. This data showed how the position of maximum OH concentration changes as the air fuel ratio changes. More work needs to be done collecting similar data on the various types of solid rocket propellants. Also, the vidicon camera can be used to detect the presence of other radicals, such as CN, CH, etc., in flames.

Expansion of USAF AAMRL/THM Electron Microscopy Division
Capabilities with Respect to Specimen Preparation and Analysis

by
M.A.P. Strnat

ABSTRACT

The overall objective of the research was to help expand the EM tissue preparation and EDS x-ray analysis capabilities of the AAMRL/THM Electron Microscopy Division. My personal objectives were the refinement of existing ceramic sample preparation techniques, evaluation of plastic embedded samples as EDS analysis specimens, construction and testing of a freeze-drying unit and training of new researchers in the SOPs of the EM facility. These objectives were met as follows:

An EDS program was written which provides reproducible and comparable spectra of ceramic capsules, powders and cements. Plastic embedded bone samples were found to be reasonable EDS specimens if properly cleared of methacrylate. This technique requires further refinement. A simple and economical freeze-drier was constructed which will serve the infrequent freeze-drying needs of the Toxic Hazards EM laboratory. Seven new researchers were trained in various aspects of tissue preparation, SEM, and EDS analysis.

TRANSLATION OF TRW's ADAPT-II TO A PERKIN-ELMER OS-32 ENVIRONMENT

by

John Swift

ABSTRACT

TRW's ADAPT-II is a software implementation of an adaptive net structure. This software package was acquired for use by AFWAL/AAWA-2. However, this program was written for a VAX-VMS environment, and the operating environment available to the group is a Perkin-Elmer OS-32, MTM operating system. My assignment for this summer from Maj Johnson, was to work toward adapting the software package to run on the local system. At first glance this seemed like a fairly straightforward task since the package is written in a high-level language, Pascal. The package though, was written in an extremely system dependent manner making extensive use of the VMS Pascal-extensions in a very convoluted manner. In addition, the software is only sketchily documented, making the translation a much larger effort than expected initially.

MBTI Psychometric Study of United States Air Force
Aircrew Personnel

Moussa Pierre Tamer

ABSTRACT

A retrospective study of MBTI scores of thirty-four aircrewmembers from Air Force files were analyzed and integrated to yield information of personality structure and patterns among the group. Comparisons with other sample populations were made, as well as with a previous study from the School of Aerospace Medicine.

HIGH POWER DENSITY EVAPORATIVE COOLING

by

Donald E. Tilton

ABSTRACT

The purpose of this research was to investigate high power density evaporative cooling. This cooling method is desirable for removing large quantities of heat from a surface while maintaining a low surface temperature. An experimental apparatus to fully investigate the heat transfer capabilities for a variety of spray characteristics was designed and built.

Initial testing of the apparatus was completed to assure proper operation and decide on a suitable test matrix. Extended testing revealed a problem with water leakage. The insulation surrounding the heater block was becoming saturated causing unacceptably high heat losses. The thermocouples in the test surface also gave periodically unreliable readings due to inadequate electrical insulation. Despite these minor problems with the apparatus, enough preliminary data was obtained to identify the parameter variation necessary to fully investigate the heat transfer process. Before extensive testing can be completed, design modifications must be implemented to correct the problems encountered during initial testing.

The preliminary data shows that the heat transfer coefficient and the maximum heat flux are highly dependent on the spray characteristics. Changing the nozzle orifice diameter, pressure, and height above the surface will have an effect on droplet diameter, velocity, and surface saturation which greatly influence the heat transfer process. During initial testing, heat fluxes approaching 800 W/cm^2 were obtained at surface temperatures of less than 150°C .

VISUALIZATION OF JET DIFFUSION FLAMES

by

Peter S. Tschen

ABSTRACT

Vertical and horizontal laser sheet lighting were used to study jet diffusion flames. Three different fuels, which were seeded with titanium tetrachloride vapor were used for flow visualization of the flames. Test conditions for the fuel flow rates fall in the range of 0.24 m/s to 19.0 m/s with three different nozzle geometries.

Flow visualizations were documented by still photographs, high speed movies and visual observations. Along with visual observations, movies and photographs provided detailed visualization of symmetric structures at low flow rates and asymmetric structures of partially lifted flames at high flow rates.

Finally, some preliminary studies of methane mixed with nitrogen flames, height of lifted flames as a function of annular velocity and buoyancy effects on flames that were tilted 30 degrees from vertical were performed. More work needs to be done in this area.

The Effects of Stress and Crisis Conditions on Decision Making

Cheryl Ulmer

ABSTRACT

The current literature on decision making under stressful and crisis conditions was reviewed. It was found that under stressful circumstances decision makers had a tendency to limit their search for information, exaggerate favorable conditions, and to overstate the unlikeliness that any action would take place. With extreme stress such as that which is evident in crisis situations, decision makers again exhibit premature closure, fail to search for all options, and reject contradictory information. It was suggested that more research be initiated examining real life situations of decision making under stress and crisis.

Numerical Calculations of Thermal and Dopant Diffusion
in ion-implanted laser-annealed silicon

by

Joseph C. Varga

ABSTRACT

Radiation from high-power lasers has been used to anneal the lattice damage caused by ion implantation, recrystallize the amorphous layer, and diffuse the surface deposited dopants. For a sufficiently high incident laser intensity, the near surface region of the semiconductor can melt and stay molten for times of the order of 100 nsec. During this time the dopants diffuse in the liquid state and ultra-rapid recrystallization occurs. When a finite difference calculation of the thermal diffusion in laser annealing was compared with the Improved Adiabatic Approximation method of Moroi¹, the results were found to agree within a few percent. Using the time that the surface layer remained molten obtained from the thermal calculation, the final dopant distribution was calculated using the dopant diffusion equation and finite difference techniques. The calculation was done in the instantaneous approximation. Further work needs to be done to account for segregation effects.

VOID AND BOUNDARY LAYER EFFECTS ON THE
STRESS DISTRIBUTION NEAR CYLINDRICAL INCLUSIONS

by

Gregory L. Walker

ABSTRACT

A finite element analysis of two closely spaced, solid cylindrical inclusions in a soft surrounding matrix was undertaken. Both materials were assumed to be isotropic and incompressible. The region between the inclusions is a zone of stress concentration and is in a tri-axial stress state. Void formation due to tearing, peeling, de-wetting, or other similar phenomenon has been modeled by assuming a very low Youngs modulus in those regions; the resulting stress re-distribution and stress concentration reductions are then viewed and tabulated. The size and location of voids and the modulus of two thin boundary layers which separate the inclusion from the matrix are varied to gain insight on the inter-relationships between these effects and the resulting stress pattern.

Experimental Studies on Heat Pipe Coupling and Condensation Rates in Packed Beds of Spheres

Mark M. Weislogel

ABSTRACT

Coupled Heat Pipes

A steady state model using an electrical circuit analogy was developed to estimate the proportions of heat transferred through the coupled system given a certain condenser heat input to one of the pipes. It was found that the higher the condenser heat input to the Target pipe, the larger the proportion of heat is transferred through the couplings to be dissipated by the Rescue pipe is in comparison to that "dumped" into the central evaporator. Also, the greater the ratio of the coupling length to the evaporator length, the higher the heat dissipated by the Rescue pipe.

The experimental portion of the research was not completed, but the procedure and apparatus concepts were fully developed.

Packed Bed Study

An experimental research program was developed and proposed concerning the condensation phenomenon in packed beds of spheres. A load cell approach will be used to monitor the condensate and vapor fronts as they propagate across the bed upon its charging. Little research has been done in this area and, though the work proposed is fundamental in nature, it has direct application in energy storage system design and performance.

An Investigation of Prospective Media for Thin Film
Fabrication of III-V Semiconductors

by

Steven P. Wicelinski

Abstract

Investigations have been performed to determine the prospects of electrochemically forming layers of the III-V semiconductor gallium arsenide from an AlCl_3 :1-methyl-3-ethylimidazolium chloride room temperature molten salt. Basic electrochemical studies of gallium and arsenic species in 1-methyl-3-ethylimidazolium chloroaluminate molten salts have been carried out. In addition, electrodeposition experiments under potentiostatic conditions were performed to determine if GaAs films could be produced by codeposition in the AlCl_3 -MEIC molten salt system. Characterization of novel low temperature melts based on gallium chloride was begun involving differential scanning calorimetry, electrochemical and nuclear magnetic resonance studies.

Study of Oxygen-Related Defects in Electron-
Irradiated, Boron-doped Silicon

by

Celeste Benay Williams

ABSTRACT

Radiation-induced defects in electron-irradiated, boron-doped silicon have been studied by means of a capacitance transient technique. The technique is known as Deep Level Transient Spectroscopy, DLTS. The DLTS spectra for the sample were obtained and analyzed to find the energy levels and concentrations of deep defects introduced into the energy gap region of a semiconductor. Samples were fabricated by ion implantation techniques to determine the role of oxygen concentration in defect formation in boron-doped silicon.

A Study of Finite Element Method in Limited
Area Weather Prediction Modeling

by

Cornell L. Wooten

ABSTRACT

A preliminary study of the use of finite element techniques in limited area atmospheric models was performed. This included a survey and summarization of the basic theory and programming procedures employed in finite element approximations. Attention was then focused on the fully operational Canadian model, particularly on the development of the finite element grid scheme. A key component of this is a 2-dimensional nonuniform rectangular grid which contains a subregion of high resolution. An alternative grid, consisting of a combination of rectangular and trapezoidal elements, was developed. This grid contains fewer elements in the overall domain while maintaining the same high resolution over the area of interest. A finite element program to solve a Poisson equation using a simplified version of either grid scheme was written. Runs were made with both grid types and the results were compared at the grid points within the high resolution region. The error at most of these point were smaller for the new grid. More extensive tests should be conducted; however, these results indicate that further investigation of the new grid scheme is warranted.

John S. Wroblewski

Synthesis and Polymerization of Dinitropropyl Vinyl Ether

ABSTRACT

Energetic polymers are recently being investigated because of their use as binders in solid rocket propellants. For this reason, the synthesis of dinitropropyl vinyl ether (DNPVE) and its energetic prepolymer has been undertaken. The polymerization of DNPVE was carried out with a p-dicumyl chloride/AgSbF₆ catalyst system at -88°C. The catalyst, p-dicumyl chloride, is a bifunctional catalyst and will be incorporated within the polymer. The polymer chain was terminated with ethanolamine which results in a hydroxyl group at both ends of each polymer chain. By changing the monomer catalyst ratio, the molecular weight of the polymer was controlled. A polymer with molecular weight of 1600 to 1700, gave the best splitting patterns in the NMR spectra. Further work is needed on the physical properties of the polymer for complete evaluation as binder for solid rocket propellants.

Development of a High Speed Infrared Detection and Recording
System with Resident Image Processing and Graphic Data
Display for Support of Remote Defense Nuclear Agency
High-Powered Pulsed Microwave Source Measurements

by

Jon D. Zobel Jr.

ABSTRACT

Infrared detection and measurement of electromagnetic field strengths is used at the University of Colorado at Colorado Springs (UCCS). In each experiment, the measurements are of steady-state, continuous wave (CW) conditions. However, Seiler Labs was asked to support the test of a pulsed microwave source to be conducted by the Defense Nuclear Agency (DNA) at the Air Force Weapons Lab (AFWL) in late July or early August, 1986, and the AGA Thermovision 780 system that is used at UCCS is not suited for such tests. Subsequent investigation revealed that an appropriate and affordable system could not be obtained for the test. At that point, a means of adapting the present system at UCCS to support the test was pursued. The resulting system consists of the AGA system, and a modified IBM PC/AT to store the data and do all of the necessary data/image processing at the remote test site. The effort was a three phase group effort. It included hardware development, software development, and detection material acquisition. This report covers the hardware portion of the project.